

Increased Competitiveness of Indonesia's Rubber Rubber Exports After The Enactment of ACFTA (Asean-China Free Trade Agreement)**Febriani¹, Wisnu Hendra Kartika Aji², Didi Widia³**

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Keywords

Export, Natural Rubber, ACFTA

Abstract

The ASEAN-China Free Trade Agreement (ACFTA), which came into effect in January 2010, aims to increase economic cooperation and remove trade barriers. However, the value of Indonesia's rubber exports decreased significantly after the implementation of this agreement. This study uses the gravity model and Revealed Trade Advantage (RCTA) method to analyze the factors affecting the decline in the value of Indonesia's rubber exports. The data used covers the period 2001-2022 and is taken from various sources including TradeMap and interviews with rubber exporters. Findings show that the value of Indonesia's rubber exports to China and ASEAN countries has fluctuated, with a significant decline after 2011. Gravity model analysis shows that ASEAN-China real GDP growth is negatively related to the value of Indonesian rubber exports, while other factors such as exchange rates and commodity prices also play a role. The decline in Indonesia's rubber export competitiveness is not only caused by the implementation of ACFTA, but also by internal factors such as low productivity and underinvestment. Recommendations are given for commodity price adjustments to improve Indonesia's rubber export competitiveness.

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**INTRODUCTION**

Plantation products are one of the key sectors in the Indonesian economy, and changes in the country's foreign exchange in trade with ASEAN countries and China can have significant implications (Darmanto et al., 2021). The Free Trade Agreement between ASEAN and China has provided greater market access for Indonesian plantation products to the ASEAN and Chinese markets (Kuik & Rahman, 2023). One of the leading products of Indonesia's plantations is rubber sap with HS Code (Harmonized System) 400110 (natural rubber latex). Rubber gum plantations have the potential to increase foreign exchange earnings through exports. However, since the entry into force of the ASEAN-China Free Trade Agreement in 2010. The export value of Indonesian rubber plantations has decreased significantly. At first, the export value of rubber rubber has increased from 2001 to 2011. Then, after 2011, the export value of rubber rubber continues to decline very significantly so that the value of exports back as in 2005.

According to media Republika, some tire factories abroad prefer to buy from Thailand because the country sells at a lower price than in Indonesia, which is around 1.61 US dollars/kg. Thailand's higher rubber productivity compared to Indonesia does allow the country to sell at a cheaper price. The production of domestic rubber plantations is also slightly impaired due to the increased frequency of rainfall, which can affect the quality of rubber sap. According to Indonesia Investment, compared to other rubber-producing competitor countries, Indonesia has a low level of productivity per hectare. Some of the factors are the old age of rubber trees in Indonesia and the lack of investment ability of smallholders, which in turn results in a decrease in crop yields. Meanwhile, Thailand produces 1,800 kg / ha. Rubber productivity in Vietnam (1,720 kg/ha) and Malaysia (1,510 kg/ha) is also higher than in Indonesia. In addition, China's decision to impose a lockdown

also greatly affect the price of rubber in the global market. Because the loss of demand from the country also has a direct impact on selling prices.

Based on previous research on the effect of ACFTA using the gravity model method, that the decline in the value of exports can be caused by many variables such as real GDP of ASEAN countries and China, real exchange rates, rubber latex commodity prices, State inflation, or even the implementation of free trade agreements (ACFTA) (Mulatsih, 2019). Therefore, an in-depth analysis is needed related to this issue, whether the value of Indonesia's rubber rubber exports decreased due to the implementation of ASEAN-China free trade or precisely due to other variables such as real GDP, exchange rates, commodity prices, and inflation (Siregar, 2014). To analyze which variables affect the decline of rubber gum Indonesia will use the gravity model method. After calculation using gravity model method. Then, the author will see which variables affect the export value of Indonesian rubber. After that, the author will also use the Revealed Comparative Trade Advantage (RCTA) method to see whether Indonesian rubber rubber commodities still have strong or weak competitiveness (Fidhayanti et al., 2024). If it turns out, the competitiveness of Indonesian rubber rubber commodities is weakened or even negative and is also caused by one of these variables. Thus, the author will provide advice to relevant parties involved in accordance with the case. Suppose, competitiveness decreases caused by commodity prices. So, the advice given is in the form of commodity price adjustment as in 2011. The suggestion is expected to be able to improve the competitiveness of Indonesia's rubber export value as in 2011. The following authors collect data on rubber rubber exports from Indonesia to China for the period 2001-2022.

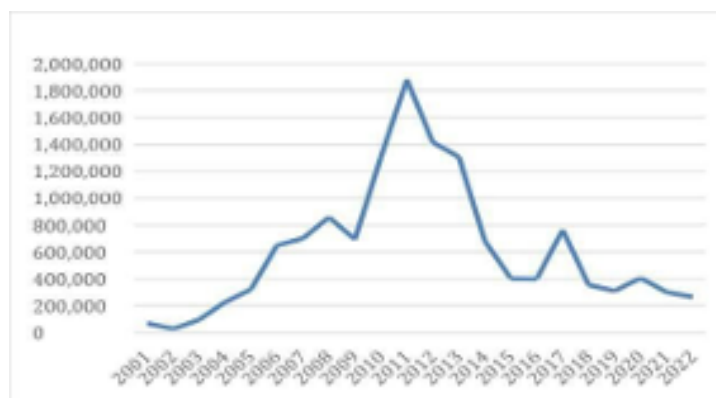


Figure 1. The value of Indonesia's rubber exports to China

Figure 1 shows the changing conditions of international trade from year to year, especially the export trade of Indonesian raw rubber to China. Data from 2001-2010 showed a significant increase in trading Table. The years 2001-2010 were the year before the ASEAN-China Free Trade Agreement was enacted. 2011-2022 is the year of the ASEAN-China Free Trade Agreement. In the year before the enactment of ACFTA (ASEAN-CHINA Free Trade Agreement) saw a significant increase in 2001 to 2007. The increase from 2001 to 2007 reached 800,000,000 US dollars. The decline had occurred in 2009, which is down as much as 100,000,000 US dollars from the previous year. But in the following years (2010-2011) increased to 1,100,000,000 US dollars.

After the enactment of ACFTA (ASEAN-CHINA Free Trade Agreement) Policy, raw rubber exports from Indonesia to China decreased from year to year (Somjai & Patchimnan, 2016). In 2011 to 2016 alone the decline reached 1,400,000,000 US dollars. But indeed the state of exports rose briefly in 2017 increased by 400,000,000 US dollars. The situation did not last long, in the following years (2018-2022) the state of exports decreased.

Indonesia is one of the countries that has been named as the largest rubber producer in the world. Indonesia managed to produce an average of 3,373,000 tons in the period 2014-2018. As the largest rubber producing country, it is not surprising that Indonesia is a rubber supplier in various countries. The majority of rubber products in Indonesia are exported to other countries such as the United States, Finland, Japan, China, to Turkey.

Although ACFTA is a policy that takes place in ASEAN countries, but with this policy rubber exports from Indonesia to the world are also affected. Here the author has collected data on rubber exports from Indonesia to the world.

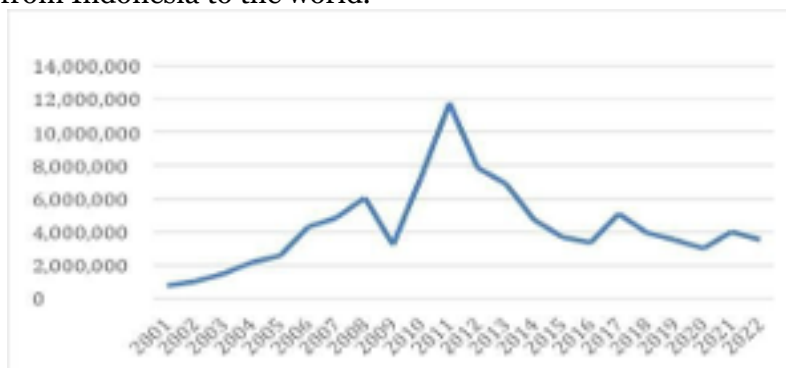


Figure 2. The value of rubber exports from Indonesia to the world

Figure 2 shows the changing conditions of rubber exports from Indonesia to the world from 2001-2022. The table shows that the export of rubber rubber from Indonesia to the world from 2001 - 2007 from year to year has always increased. In 2007 alone the value of exports has reached 6,000,000,000 US dollars. This figure is 5,000,000,000 higher than the value of exports in 2001. However, this situation did not last forever, in 2007 to 2009 the value of exports decreased by 2,500,000,000 US dollars. So in 2009 the export value was in the range of 3,500,000,000 US dollars. The situation changed again in the following year (2010), in 2010 to 2011 the value of exports increased dramatically. Even in 2011 was the peak point of the increase in the value of exports with figures in the range of 11,800,000,000 US dollars. However, export conditions decreased again periodically from 2011 to 2022 with the value of exports in 2022 in the range of 3,800,000,000 US dollars.

Indonesia, as one of the leading producers in the rubber gum sector, plays an important role in the export of this commodity to ASEAN countries (Joseph & Hari, 2019). Indonesia's rubber rubber exports to the ASEAN region not only reflect Indonesia's economic potential, but also create a major impact in the dynamics of regional trade (Marks, 2015). One of the main factors that support Indonesia's rubber exports is the high quality of its products. Indonesia has succeeded in producing superior rubber sap that meets international standards. This ability to provide high quality products has become a major attraction for ASEAN countries that need rubber industry raw materials for their manufacturing sectors (Putri, 2022).

The condition of Indonesia's rubber export to ASEAN is also influenced by the prevailing policies. ACFTA (ASEAN-China Free Trade Agreement) is one of the policies on international trade in the ASEAN region. So do not be surprised if the condition of rubber exports from Indonesia to the ASEAN region is strongly influenced by the policy. The following authors present data on Indonesia's rubber rubber exports to ASEAN countries for the period 2001-2022.

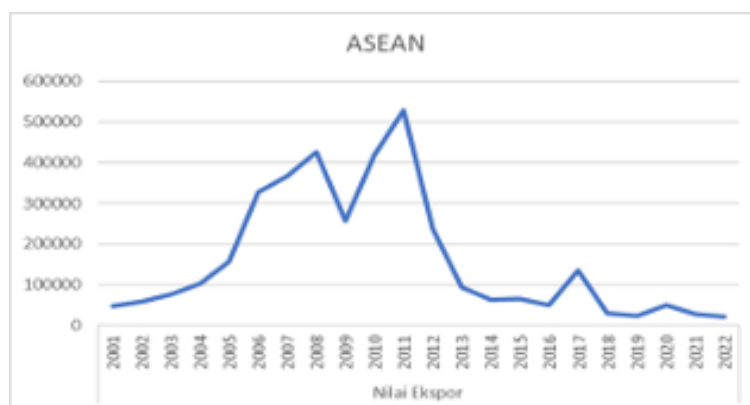


Figure 3. The value of Indonesia's rubber exports to ASEAN countries

Figure 3 shows a diagram of the amount (US dollars) of rubber exports from Indonesia to ASEAN countries. According to the diagram, apparently the ASEAN-China Free Trade Agreement (ACFTA) policy greatly affects exports from Indonesia to ASEAN countries. Since the enactment of the policy, precisely in 2011, the number of exports has decreased quite drastically. It can be seen, the decline in the amount of export value reached less than \$500,000,000. As a result, the number of exports from the year since the enactment of ACFTA is only in the range of less than \$100,000,000.

Domestic natural rubber prices in Indonesia tend to increase from year to year. In the last 10 years the price of domestic rubber has increased by about Rp. 7,000. Although always increased, but in 2015 the price of rubber had dropped dramatically which was originally around Rp. 16,000 down to about Rp. 11,000. In the next year, 2016, rubber prices rose again with prices around Rp. 18,000. Although our rubber supplies are abundant, domestic rubber prices tend to rise each year. Many factors contribute to this, one of which is inflation.

As the third largest rubber producer in the world, Indonesia certainly conducts export-import activities in the ASEAN region. Export-import activities are still running smoothly despite the ACFTA policy. From other countries, Indonesia exports the most to Singapore with a total value of 2,788,930,000 US dollars (2001-2022). This value is able to control 78.3% of the total exports of Indonesian rubber to other ASEAN countries. Seen through trademap data, Singapore imports rubber with HS Code 400110 (natural rubber latex) from Indonesia very much. However, rubber with HS Code 400110 (natural rubber latex) exported by Singapore to other countries is 0 (Singapore does not export) on commodities with the HS Code. It can be assumed that, commodities with HS Code 400110 (natural rubber latex) are imported by Singapore to be processed into finished products or derivative products. Then, the finished product or derivative products will be exported to other countries.

The international Tripartite Rubber Council (ITRC) was established after the signing of the Bali Declaration on December 12, 2001 in Bali, Indonesia. The ITRC is an active collaboration between Thailand, Indonesia and Malaysia (TIM) to sustainably increase the price of natural rubber in the global market, with the aim of ensuring fairness and profitability for rubber farmers (Rumokoy, 2020). As part of this effort, the International Rubber Consortium Ltd (IRCo) was established in Bangkok. Basically, IRCo is a joint venture formed through a Memorandum of Understanding (MoU) approved by all three major natural rubber producing countries in 2002.

Despite the ITRC, the value of rubber exports continues to decline every year. The world's three major natural rubber producing countries agreed to make efforts to control prices so that rubber commodities can provide fair rewards for farmers. As a founding member of the ITRC, Indonesia is required to adhere to the regulatory scheme of work that has been created, including restrictions on natural rubber exports to regulate supply in the global market. The aim is to influence the global price of natural rubber by increasing prices through export restrictions. This policy will have an impact on Indonesia's smallholder plantation communities, as most of the rubber plantations are owned by them. Although the AETS scheme has been implemented, the global price of natural rubber has not increased. Instead, the price of natural rubber continues to decline year after year.

This shows that there are many other obstacles outside the ITRC's control that affect the price of natural rubber. ITRC policies such as the Supply Management Scheme (SMS), Agreed Export Tonnage Scheme (AETS), and Demand Promotion Scheme (DPS) will still be continued by the government as domestic policies. On the other hand, government policies can be considered as interventions because the market cannot achieve the goal of public welfare independently. Although policy objectives are achieved, there are often parties who are affected or experience side effects. Policies implemented by the Indonesian government through the ITRC can have an impact on member countries, especially for rubber farmers.

This study offers novelty by combining quantitative analysis approaches through gravity and RCTA models to explain the factors affecting the decline in the value of Indonesian rubber exports. In addition, this study also considers internal factors that have been overlooked in previous studies, such as low productivity and minimal investment levels among smallholders.

This study aims to analyze the effect of ACFTA and other factors on the value of Indonesian rubber exports, and provide strategic recommendations to improve the competitiveness of rubber products in the international market. The results of this study are expected to provide input for stakeholders, both government and industry players, to formulate more effective policies in improving the competitiveness of Indonesian rubber exports. In addition, this research can also serve as a reference for future studies related to free trade and the plantation sector.

RESEARCH METHODS

This research takes the case of Indonesia's rubber trade in ASEAN countries and China. The research was conducted from October 2023 to February 2024. The methods used include quantitative analysis with the gravity model and Revealed Comparative Trade Advantage (RCTA) to evaluate factors affecting the value of rubber exports. Data collection was conducted by combining primary and secondary data. Primary data was obtained through interviews with five Indonesian rubber exporters. Secondary data in the form of time series data were taken from the TradeMap website, covering Indonesian rubber exports to China, exports to the world, and exports to five ASEAN member countries (Malaysia, Singapore, Vietnam, Thailand, and the Philippines) for the period 2001-2022. The recruitment of respondents used purposive sampling technique. This method was chosen to ensure that the respondents involved were individuals with relevant knowledge and experience in the rubber trade. The respondents consist of rubber exporters who are active and experienced in the international market, so that the information obtained can provide a deeper insight into the challenges and opportunities in Indonesia's rubber exports. Descriptive analysis will be conducted to provide an overview of export trends, imports, and market dynamics. After that, a gravity model will be applied to analyze the influence of variables such as real GDP, exchange rate, world rubber price, inflation, and ACFTA implementation on the value of rubber exports. The RCTA method will also be used to evaluate the competitiveness of Indonesian rubber commodities in the context of international trade. Chow test and Hausman test will be conducted to determine the most appropriate model, whether it is Pooled Least Square, Fixed Effect Model, or Random Effect Model. The results of the analysis will be interpreted to provide recommendations for stakeholders, including strategies to improve the competitiveness of Indonesian rubber exports. Through this systematic research flow, it is expected that the results of the analysis can provide comprehensive insights into the factors affecting the value of Indonesian rubber exports after the implementation of ACFTA.

RESULTS AND DISCUSSION

ACFTA is a working agreement on Comprehensive Economic Cooperation between ASEAN and the people's Republic of China that was approved on 4 November 2002 in Phnom Penh and entered into force in 2010, pursuant to Article 8 of the agreement. This agreement simplifies the export and import process by establishing special provisions regarding tariffs on export and import goods. According to Laird and Yeats (1990), the policy of reducing import duty rates within the framework of integrative economic cooperation can increase the demand for imports from member states involved in the integration. In this regard, trends in the value of Indonesia's potential commodity exports in the ASEAN market from 2011 need to be analyzed to understand the impact of ACFTA on Indonesia's exports.

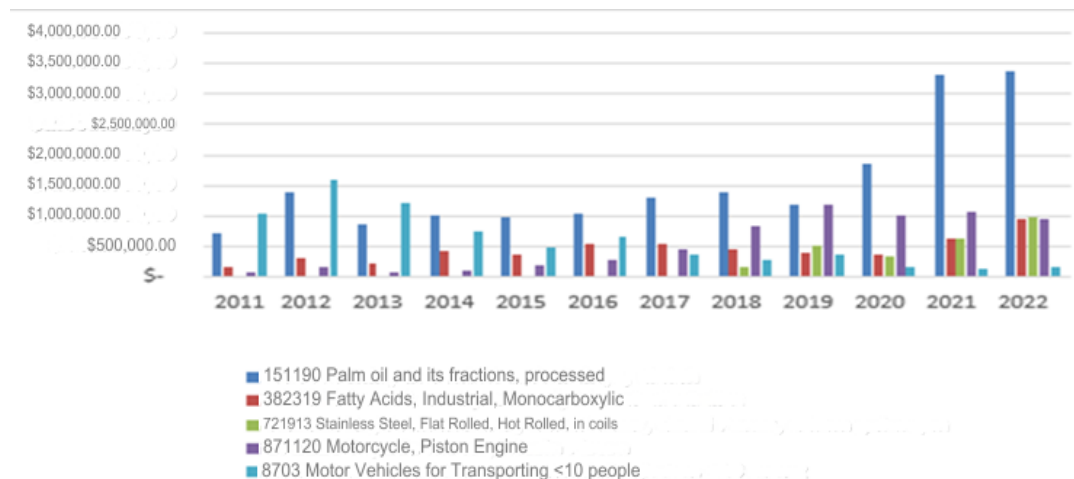


Figure 4. The value of Indonesia's potential commodity exports in the ASEAN market after the implementation of ACFTA in 2011-2022

Source: (Trademap, 2024)

Figure 4. shows data on the value of Indonesia's potential commodity exports to the ASEAN market after the implementation of the ASEAN-China Free Trade Area (ACFTA) from 2011 to 2022. This bar graph presents export values in USD for several major commodities, with each commodity represented by a different colored bar. Commodities analyzed are palm oil and its fractions processed (HS code 151190), fatty acids, Industrial, Monocarboxylic (HS code 382319), Stainless Steel, Flat Rolled, hot rolled, in Rolls (HS code 721913), motorcycles, Piston engines (HS code 871120), and Motor Vehicles for Transport <10 people (HS code 8703).

Based on the data, it provides a clear picture that palm oil and its fractions dominate exports with a significant surge in 2021 and 2022, indicating strong demand and strategic position in the global market. Exports of motor vehicles for <10 people increased rapidly after 2017, showing growth potential in the automotive sector. Meanwhile, fatty acids, stainless steels, and motorcycles show a steady trend with consistent export values, signaling the need for innovation or new marketing strategies. The implementation of ACFTA appears to have boosted exports, particularly for palm oil and motor vehicles, with this trade agreement possibly expanding market access and reducing tariff barriers.

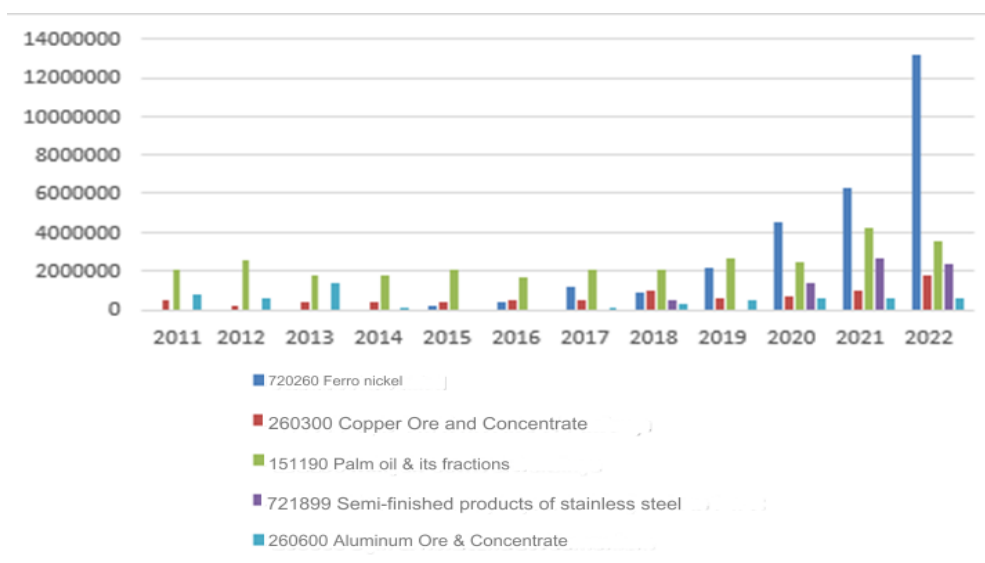


Figure 5. The value of Indonesia's potential commodity exports in the Chinese market after the implementation of ACFTA in 2011-2022

Source: (Trademap, 2024)

Meanwhile, Figure 5. shows the magnitude of the value of Indonesia's potential commodity exports to the Chinese market after the implementation of ACFTA from 2011 to 2022. Based on 2024 Trademap data. This Table covers five main commodities namely ferro nickel (HS code 720260), copper ore and concentrate (HS code 260300), palm oil and its fractions (HS code 151190), semi-finished products of stainless steel (HS code 721899), and aluminum ore and concentrate (HS code 260600). In general, the Table shows the positive impact of ACFTA on exports of several Indonesian commodities to China, with significant increases in exports of ferro nickel and aluminum ore. The Data shows that Indonesia is capitalizing on the opportunities from this free trade agreement, although market dynamics and Chinese demand are also influencing this outcome.

Based on these two data, it is concluded that Indonesia's mining and plantation sectors have increased their competitiveness in the international market, especially in China. From the two data shows commodities that have export potential value in the ASEAN market but there is no visible rubber rubber commodity (Abbas & Waheed, 2018). This is because it is related to the problem of rubber production in Indonesia which is less than optimal. According to Kompas.id, low World rubber prices lead to a decrease in productivity and price fluctuations, which makes rubber farmers abandon their gardens. Many are converting rubber plantations into other more promising crops, in contrast to other countries such as Vietnam and Ivory Coast that actually expand rubber land. As a result, the area of rubber plantations in Indonesia is shrinking and land productivity is very low, only 300 kg of crumb rubber per hectare per year, far below other rubber-producing countries.

In addition to internal challenges, external factors such as the European Union deforestation regulation (EUDR) also affect Indonesia's rubber production (Muradian et al., 2025). EUDR makes it difficult for local farmers with strict environmental sustainability requirements, thus requiring large investments in infrastructure and technology that are difficult for smallholders in Indonesia to meet. According to the Ministry of trade, 92.81% of the national rubber plantations are owned by smallholders.

Table 1. Conditions of export and import of rubber sap Indonesia to the country-ASEAN and China 2019-2022

Country	2019		2020		2021		2022	
	Export (\$)	Export (\$)	Export (\$)	Import (\$)	Export (\$)	Import (\$)	Export (\$)	Import (\$)
Malaysia	6.959	5.487	23.966	11.033	5.943	14.041	157	9.557
Philippines	6.019	156	5.280	0	9.444	136	6.542	984
Singapore	1.412	13	812	7	986	102	1,008	1
Thailand	1	13,688	0	13,747	1	34,008	1	50,536
Vietnam	9,780	16,038	19,289	14,186	11,764	28,720	12,935	27,666
China	310,465	223	406,916	48	301,588	286	265,876	976

In units of thousand USD
Source: (Trademap, 2024 processed)

Table 1 shows the export and import conditions of Indonesian rubber sap to ASEAN countries and China from 2019 to 2022. This Data covers the value of exports and imports in thousands of USD, providing an overview of the dynamics of rubber sap trade between Indonesia and these countries (Sujarwo, 2021). The table reveals that China is the main market for Indonesia's rubber sap exports, with a very high export value every year. In contrast, imports of rubber sap from China are relatively small compared to exports, which indicates a significant trade surplus for Indonesia.

Table 2. Export value of Indonesian rubber before and after ACFTA		
Countries	before ACFTA (2001-2010)	after ACFTA (2011-2022)
Malaysia	\$ 118,021	\$ 170,711
Philippines	\$ 73,077	\$ 131,206
Singapore	\$1,902,237	\$ 886,693
Thailand	\$ 2,253	\$ 1,128
Vietnam	\$ 142,051	\$ 135,680
China	\$ 4,952,923	\$ 8,496,727

Source:(Trademap, 2024)

Table 2 shows the value of Indonesia's rubber exports to various countries before and after the implementation of ACFTA, with the period before ACFTA from 2001 to 2010 and the period after from 2011 to 2022. Based on the table in general, the application of ACFTA affects Indonesian rubber exports in different ways. Countries such as Malaysia, the Philippines and China experienced significant increases in the value of exports, indicating that this agreement opens up more market opportunities. In contrast, exports to Singapore, Thailand, and Vietnam declined after ACFTA, possibly due to changes in market preferences or increased local production capacity in those countries (Boguszewski 2022). China remains a major market for Indonesia's rubber gum exports, with a huge increase in export value, reflecting high demand in China's industrial and manufacturing sectors. The impact of ACFTA varies in each destination country, depending on the dynamics and characteristics of each market.

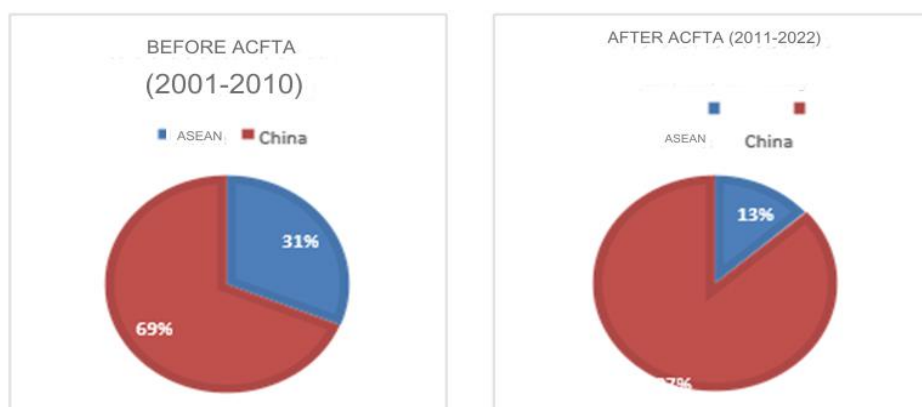


Figure 6. Pie Table of Indonesia's rubber export value to ASEAN and China before and after ACFTA

Figure 6. showing two pie Table s comparing Indonesia's rubber sap exports to China and ASEAN before and after the implementation of ACFTA. The first Diagram (2001-2010) shows that 69% of Indonesia's rubber exports go to China, while 31% go to ASEAN. The second Diagram (2011-2022) shows an increase in the proportion of exports to China to 87%, with exports to ASEAN falling to 13%.

This change reflects the positive impact of ACFTA which increases free trade, reduces tariffs, and strengthens trade relations between Indonesia and China. The increase in exports to China may be due to the high demand for industrial products and the export of finished products. Although the percentage of exports to ASEAN is declining, the absolute value of exports may still increase. The ACFTA policy shows how international trade can change the country's trade map (Anggraeni, 2019). So, in conclusion, ACFTA does not significantly reduce the export value of Indonesian rubber.

To analyze the factors that affect the change in the export value of Indonesian rubber to ASEAN countries and China, gravity model and modified gravity model can be used. Before doing the analysis with gravity model, Chow test and Hausman test to determine the right model approach. The selection of the best model was carried out by comparing estimates from three approaches: Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM). The estimated results of this model can be seen in the table.

Table 3. Chow's test and Hausman's Test

Test Type	<i>Probabilitas Cross-section</i>	
	<i>Gravity Model</i>	<i>Modified Gravity Model</i>
Chow Test	0,0000	0,0000
Hausman Test	0,0000	0,0000
Result	FEM	FEM

Source: Trademap, Calculation Results Eviews 12

Based on the results shown in the table, the probability of the Chow test for the Gravity Model is 0.0000, which is lower than the significance level of 0.05 (5%). The results show that Ho is rejected, and the most suitable model is the Fixed Effect Model (FEM). In addition, the probability of the Hausman test for the Gravity Model is also 0.0000, which is also lower than 0.05 (5%), supporting the decision to use FEM as the right model. The same is true for the Modified Gravity Model, where the probability values of the Chow Test and the Hausman test are also 0.0000, respectively, which is lower than 5%. Thus, indicating that FEM is the right model approach for Modified Gravity Model as well.

Table 4. Fem test

Varibel	<i>Gravity Model</i>		<i>Modified Gravity Model</i>	
	<i>Koefisien</i>	<i>Probabilitas</i>	<i>Koefisien</i>	<i>Probabilitas</i>
C	42,9342	0,0527	19,6317	0,2965
LnGDP Rill Indonesia	0,6443	0,5408	-	-
LnGDP Rill Asean China	-1,6323	0,0234	0,0983	0,0125
Distance	-0,4813	0,2604	-3,8005	0,9308
LnInflation	-	-	0,0117	0,9528
LnRER	-	-	-0,9122	0,6328
LnWorld Rubber Prices	-	-	0,9340	0,0731
LnDomestic Rubber Prices	-	-	0,0929	0,8183
Dummy ACFTA	0,0065	0,9884	-0,1242	0,7305
<i>Weighted Statistics</i>				
R-square	0,8868		0,9357	
Prob (F-statistic)	0,0000		0,0000	
Sum square resid	99,3097		50,7439	
Durbin-Watson stat	1,1101		1,2432	
<i>Unweighted Statistics</i>				
Sum square resid	120,0224		68,1464	
Durbin-Watson stat	0,8634		0,8271	

Based on the analysis of data from the table, the results of the Fixed Effect Model (FEM) model for the panel data were obtained. In the Gravity Model, the R-square value of 0.8868 indicates that 88.68% of the variation in the dependent variable can be explained by the independent variable in the model. The rest, which is 11.32%, is influenced by other factors that are not included in the model. While for the Modified Gravity Model, the value of R-square reached 0.9357, which means 93.57% variation in Indonesia's rubber exports can be explained by the independent variables used in the model. The rest, which is 6.43%, is influenced by factors not covered by the model.

Both models, both Gravity Model and Modified Gravity Model, have passed the feasibility test with a very low probability (F-statistic) value of 0.0000. Thus showing that there is at least one independent variable that has a significant influence on the dependent variable.

In the Gravity Model, the ASEAN-China Real GDP has a negative and significant influence on the confidence level of 5% ($\textcircled{3}=0.05$), as seen from a probability value lower than 0.05. This result indicates that the increase in ASEAN-China Real GDP is associated with a decrease in the value of Indonesia's rubber rubber exports, assuming other variables remain constant.

While other variables, namely Indonesia's real GDP and Dummy ACFTA did not show a negative and insignificant effect on the confidence level of 5%, so it did not significantly affect the export value of Indonesian rubber sap (Mulatsih, 2019). Distance also had a negative but insignificant effect on the 5% confidence level, suggesting that distance had no meaningful impact on the value of exports in this model. In regression analysis, a negative coefficient indicates a negative relationship between the independent variable and the dependent variable. That is, if the independent variable increases, the dependent variable tends to decrease, assuming that the other variables in the model remain constant.

Meanwhile, in the Modified Gravity Model, the results are consistent with the Gravity Model, where the ASEAN-China Real GDP shows a significant and negative influence (Irshad et al., 2017). This means that the increase in ASEAN-China Real GDP is significantly associated with a decrease in the value of Indonesia's rubber rubber exports. In contrast, variable distance, inflation, Real Exchange Rate (RER), domestic rubber prices, World rubber prices, and Dummy ACFTA showed no significant effect on the confidence level of 5% (0.05). However, the distance and RER variables showed a negative influence. That is, each increase of one unit in the logarithms of distance and RER is associated with a decrease of 3.8005 units and 0.9122 units, respectively, in the dependent variable (such as trading volume or other variables analyzed), assuming that the rest of the variables remain constant.

Table 5. The Competitive Status Of Rubber

Period	RXA	RMP	RCTA (RXA-RMP)	competitiveness Status Competitiveness
2001	1.502960789	0.082207489	1.4207533	positive
2002	0.850868209	0.07311319	0.777755019	positive
2003	1.08613161	0.060637345	1.025494265	positive
2004	1.640405259	0.039031646	1.601373613	positive
2005	1.830217871	0.024295952	1.805921919	positive
2006	2.294503076	0.036569563	2.257933513	positive
2007	2.322766726	0.030424557	2.292342169	positive
2008	2.260435184	0.024482749	2.235952435	positive
2009	2.06561246	0.037697072	2.027915387	positive
2010	2.128783227	0.038050643	2.090732584	POSITIVE
2011	1.668159959	0.035493665	1.632666294	POSITIVE
2012	1.792860289	0.052619058	1.740241231	POSITIVE
2013	1.674398976	0.04123211	1.633166865	POSITIVE
2014	1.506517665	0.051580674	1.45493699	POSITIVE
2015	1.328451288	0.067420901	1.261030387	POSITIVE
2016	1.383948326	0.072086503	1.311861823	POSITIVE
2017	1.772050173	0.061988309	1.710061863	POSITIVE
2018	1.058993739	0.080650226	0.978343514	POSITIVE
2019	1.056571963	0.081978262	0.974593701	POSITIVE
2020	1.525994192	0.110055352	1.41593884	POSITIVE
2021	0.721290242	0.133451586	0.587838656	POSITIVE
2022	0.601886151	0.142808287	0.459077864	positive

Source : Trademap, Microsoft Excel 2019 (Processed)

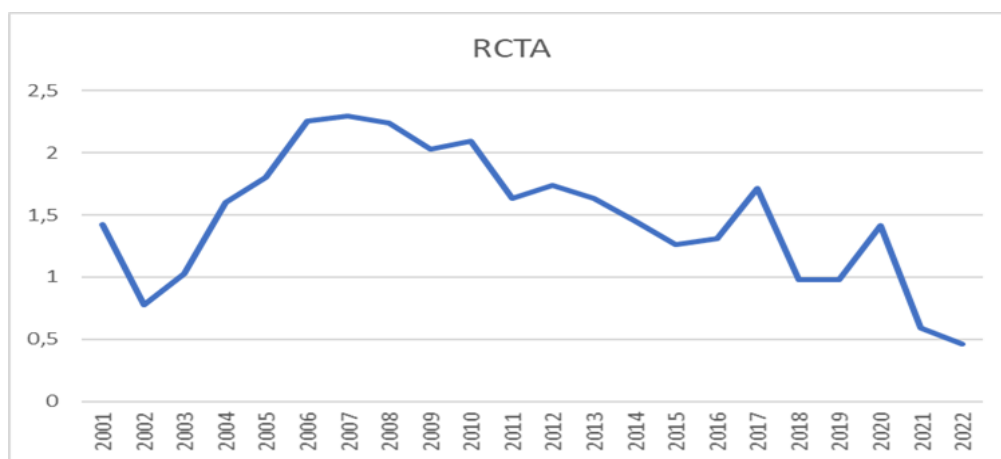


Figure 7. Grafik RCTA Getah Karet Indonesia HS Code 400110

Based On Table 5. it can be seen that the competitiveness status of Indonesian rubber sap from 2001 to 2022 showed a positive value ($RCTA > 0$), which indicates that Indonesian rubber sap still has sufficient competitiveness to be exported. However, Figure 7. shows a significant decrease in the competitiveness of Indonesian rubber from 2007 to 2022. This graph shows a downward trend that continues until the competitiveness of rubber sap approaches the level of 2002, even lower in 2022 than in 2002. Although there were increases in 2016 to 2017 and from 2019 to 2020, these increases were not enough to return competitiveness to 2006 levels.

If this decline in competitiveness continues until it reaches negative values, the rubber industry and the economy as a whole could suffer several significant impacts:

1. Decrease in prices, because to remain competitive producers may need to lower selling prices, which will have an impact on decreasing profit margins or even losses for producers.
2. Decrease in production, considering that if demand decreases and prices continue to fall, manufacturers may reduce or stop production, which will lead to a reduction in jobs in the rubber sector.
3. Rubber farmer crisis, due to a decrease in competitiveness and prices can lead to an economic crisis for rubber farmers, who may be forced to switch to other commodities or leave the agricultural sector.
4. Increased imports, caused if the domestic industry can not compete, domestic consumers may import more rubber from abroad, which will weaken the resilience of the domestic economy.
5. Macroeconomic impact, the rubber industry is an important part of the economy in several regions in Indonesia. A significant decline in the industry could have a negative impact on regional and national economies, including a decrease in local income, foreign exchange, and an increase in poverty. In addition, if this trend continues, Indonesian rubber sap could be displaced from the list of leading commodities due to a decrease in competitiveness or even reach negative values.

This decline in the competitiveness of Indonesian rubber needs to be addressed immediately so that it does not continue until it reaches a negative value. Considering that although Indonesian rubber sap has decreased competitiveness from 2006 to 2022, the competitiveness status of Indonesian rubber sap still shows positive values. According to the Investment Coordinating Board (BKPM) (2020), the agriculture, plantation, and livestock sectors are one of the five main sectors in investment in Indonesia. In addition, support through the people's Business Credit (Kur) also helps increase the capital production of farmers. This government support is the reason why the competitiveness of Indonesian rubber remains positive.

This positive value indicates that there are opportunities to increase the competitiveness of Indonesian rubber, especially with the potential for cooperation in ASEAN and China. However, rubber production in Indonesia is still considered less than optimal, which requires improvements to support rubber farmers. Indonesian rubber prices tend to be higher because of low productivity, one of which is caused by high rainfall that affects the quality of rubber sap. In addition, low World rubber prices have an impact on productivity and cause farmers to leave their gardens, so that plantation land area shrinks due to land conversion and decreased productivity.

In addition, there are also external challenges such as the European Union deforestation regulation (EUDR), which is an obstacle to rubber production. EUDR requires farmers to meet strict environmental standards, which require large investments and technologies that are not always available, thereby reducing their income. To meet this challenge, the Indonesian government has initiated a joint communique on the sustainability of natural rubber commodities with the member countries of the Association of natural rubber producing countries (ANRPC). This communique, agreed at the ANRPC meeting in India in October 2023, invites the European Union and other stakeholders to consider the negative impact of regulation on rubber farmers and producers, as well as to seek fair and sustainable solutions without disrupting trade or the global supply chain of rubber.

CONCLUSION

Based on the discussion in this study, it can be concluded that the ACFTA agreement did not significantly affect the decline in the value of Indonesian rubber exports. Gravity model analysis shows that the decline was influenced by Indonesia's real GDP, ASEAN-China real GDP, real exchange rate, and domestic rubber price. Although the competitiveness of Indonesian rubber is still positive and worth exporting, it has been declining since 2006. Some foreign tire factories prefer to buy rubber from Thailand due to its lower price, while Indonesian rubber prices are higher due to low productivity, which is affected by rainfall that can reduce sap quality. In addition, low global rubber prices cause fluctuations in productivity and prices, encouraging farmers to abandon their farms and causing land shrinkage due to conversion. External factors such as the European Union's deforestation regulation (EUDR) also pose a challenge to rubber production, as farmers must meet strict environmental sustainability standards, which require investment and high technology that is difficult to afford, reducing farmers' income.

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