

## **ANALYSIS OF THE POTENTIAL COMPETITIVENESS OF NATURAL RUBBER EXPORTS IN THE GLOBAL MARKET (COMPARATIVE STUDY IN ITRC COUNTRIES: INDONESIA, THAILAND, AND MALAYSIA)**

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### **Abstract**

This study aims to calculate the competitiveness of natural rubber exports, as well as to analyze the effect of foreign exchange, rubber production and prices on the competitiveness of natural rubber in three countries namely Indonesia, Malaysia and Thailand. The method used in this study is a quantitative method with the first analysis tool to calculate competitiveness using Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) then to analyze the effect of foreign exchange, production and prices of natural rubber using multiple regression models. The results showed that the average competitiveness of Indonesia's natural rubber exports was 0.9330, Thailand 0.9338, and Malaysia 0.7763. The results of multiple linear regression showed that the exchange rate and production variables had no significant effect on the competitiveness of Indonesian and Thai natural rubber exports, while the international price variable of natural rubber had a significant effect on the export competitiveness of Indonesian and Thai natural rubber exports. And for Malaysia it shows that the three variables of exchange rates, production, and international natural rubber prices have a significant effect on the competitiveness of Malaysia's natural rubber exports.

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### **Abstrak**

Penelitian ini bertujuan untuk menghitung daya saing ekspor karet alam, serta untuk menganalisis pengaruh devisa, produksi dan harga karet terhadap daya saing karet alam di tiga negara yakni Indonesia, Malaysia dan Thailand. Metode yang digunakan dalam penelitian ini adalah metode kuantitatif dengan alat analisis pertama untuk menghitung daya saing menggunakan Revealed Comparative Advantage (RCA) dan Revealed Symmetric Comparative Advantage (RSCA) kemudian untuk menganalisis pengaruh devisa, produksi dan harga karet alam digunakan model regresi berganda. Hasil penelitian menunjukkan bahwa rata-rata daya saing ekspor karet alam Indonesia adalah 0,9330, Thailand 0,9338, dan Malaysia 0,7763. Hasil regresi linier berganda menunjukkan variabel nilai tukar dan produksi tidak berpengaruh signifikan terhadap daya saing ekspor karet alam Indonesia dan Thailand, sedangkan variabel harga internasional karet alam berpengaruh signifikan terhadap daya saing ekspor karet alam Indonesia dan Thailand ekspor karet alam. Dan untuk Malaysia menunjukkan bahwa ketiga variabel nilai tukar, produksi, dan harga karet alam internasional berpengaruh signifikan terhadap daya saing ekspor karet alam Malaysia.

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## INTRODUCTION

In the world of natural rubber trade, Indonesia, Thailand, and Malaysia are natural rubber producing countries whose supply quantity affects the global market. The constant production development of the Indonesian rubber industry has been achieved since the 1980s. about 80 percent of the country's rubber output is produced by small farmers. That is why, those who have a small position in the domestic rubber industry are the private sector and the government (Indonesia Investmens, 2018).

Since December 12, 2001, Indonesia, together with Thailand and Malaysia, have formed the International Tripartite Rubber Council (ITRC), which is a collaboration between producing countries and the largest natural rubber exporter in the global market. The purpose of the establishment of the ITRC is to handle world natural rubber prices by providing export quantities or named Agre Export Tonnage Scheme (AETS). Indonesia is able to rank second so that it is able to become the main producer and exporter of rubber in the world, supported by Indonesia's natural resources, a competitor country that competes closely with Indonesia is Thailand (Septiani et al, 2021).

The Directorate General of International Trade Negotiators (2018) explained that the work schemes owned by the ITRC include (1) Supply Management Scheme (SMS), which aims to achieve a long-term balance of natural rubber through production management, (2) Agreed Export Tonnage Scheme (AETS), limiting natural rubber exports by regulating supply in the short term, (3) Demand Promotion Scheme (DPS), increasing rubber consumption both locally and globally. In addition, ITRC also has a physical RRM (Regional Rubber Market) market which has started operations in three countries on September 26, 2016.

Export developments for natural rubber in Indonesia, Thailand, and Malaysia in 2019 to 2020 tend to experience a decline. However, Thailand is a country with the largest export value when compared to Indonesia and Malaysia. The large export value for natural rubber in Indonesia in 2019 was worth \$3,527,202,231 and in 2020 it fell to \$3,011,839,751, then for Thailand in 2019 it was \$4,142,531,651 and for 2020 also experienced a decline to \$3,525,149,550, and then for Malaysia in 2019 it was \$910,546,972 and in 2020 Malaysia also experienced the same decline as Indonesia and Thailand to \$784,565,441.

There is a transition in export value that changes its relative price, causing a product form to be estimated to be higher in price (expensive) or will be more economical. The exchange rate causes two changes, where the decline in the value of exports is caused by the decline in the value of the rupiah which experiences appreciation, which is caused by relatively higher domestic commodity prices, and vice versa if the exchange rate depreciates, the export value will increase because the global market for domestic commodities becomes competitive. . In this case, we can see the development of exchange rates between Indonesia, Thailand and Malaysia. The dollar exchange rate against the rupiah in 2019 was Rp. 14,147 and in 2020 it increased to Rp. 14,582. The dollar exchange rate against the Thai bath in 2019 was worth 30,162 and for 2020 it increased to 31,294. Then the exchange rate of the dollar against the Malaysian ringgit in 2019 was RM 4,113 and in 2020 it increased to RM 4,203.

The development of global natural rubber trade competition is indeed getting tougher among competing countries. This is an opportunity for natural rubber producers to increase the potential of natural rubber commodities and is expected to be able to increase foreign exchange from each country. The production development of Indonesian natural rubber in 2019 was 2.50 million tons and in 2020 it increased to 2.88 million tons. For Thailand, the total production in 2019 was 3.12 million tons and increased in 2020 to 4.70 million tons. And for Malaysia in 2019 the total production was 0.56 million tons, while in 2020 it decreased to 0.51 million tons.

As a commodity that is traded in the global market, natural rubber has the influence of supply and demand which plays a role in price formation in trade. From data from 2016 to 2020,

the international price of natural rubber tends to fluctuate. Where the average value of the price is 1.70 US\$. In 2016 the international price of natural rubber was 1.6 US\$/kg, in 2017 it rose to 1.99 US\$/kg, in 2018 it decreased to 1.56 US\$/kg, again increasing in 2019 to become 1.64 US\$/kg, also in 2020 it will be 1.72 US\$/kg.

International trade is a trade that occurs between governments or residents between a country which is carried out as a form of the occurrence of a system of exchange of goods and services to obtain an advantage or benefit. International trade is divided into two sides, namely exports and imports. An activity of buying goods or services from abroad to within the country is called import. While a form of activity that sells goods or services from within the country to abroad is also called export. Developed countries will get the raw materials or raw materials needed by the industry in their country by carrying out this export and import trade. Then the developed countries can sell their products to developing countries so that they can export domestically made products and increase the country's foreign exchange earnings (Purba, 2021).

The variable that determines the success of a country or region's exports in the competition that occurs in the global market is the competitiveness of a product or commodity itself. Therefore, planners continuously aim to increase the competitiveness of export products or commodities. Comparative profit based on natural resource wealth illustrates one of the variables that are predicted to be relevant in influencing competitiveness in addition to other variables, including institutions, infrastructure, human resources, and promotion. The approach used to calculate competitiveness is divided into two, namely Revealed Comparative Advantage (RCA) with Real Effective Exchange Rate (REER) (Tan, 2012).

According to Tandjung (2011) the release of goods from the Indonesian customs area to be sent abroad by following the applicable regulations, especially regarding customs regulations carried out by an exporter or who has received special permission from the Directorate General of Foreign Trade, Ministry of Trade. Export policy is based on an export policy planning program based on the National Planning Program (propenas) and Long and Medium Term Plans whose implementation is set out in the form of laws and regulations, presidential regulations, and ministerial regulations.

According to Tan (2013) the linkage of the principle of supply and demand, international trade always applies where importers will always buy a country's products whose prices are relatively lower than their country's, as well as exporters will always sell their production to countries whose prices are relatively higher than the price. local.

The price or value of a country's currency expressed in the value of another country's currency is indicated by the foreign exchange rate. Factors that affect the exchange rate include Changes in Community Taste, Changes in Prices of Export and Import Goods, General Price Increases (Inflation), Changes in Interest Rates and Return on Investment and Economic Growth (Sukirno, 2016).

The production function shows the nature of the relationship between the factors of production and the level of production produced. The term input is often referred to as the factors of production while the term output is often referred to as the amount of production. The production function formula can be expressed in the form  $Q = f(K, L, R, T)$  (Sukirno, 2008).

In Soekartawi (2005) it is explained that the link between international prices and the total volume of exports is that if the commodity prices in the global market are higher than the domestic market, the number of commodities exported will increase.

## RESEARCH METHOD

This study uses secondary data types. This secondary data uses time series data, this data was collected from 1999 to 2020 including data. The competitiveness of natural rubber in

Indonesia, Thailand, and Malaysia is the level of export value calculated using the Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative methods. Advantage (RSCA) in units of results, Exchange rate is the exchange rate of the rupiah against the US dollar expressed in rupiah units, the exchange rate of Bath against the US dollar expressed in units of Bath, and the exchange rate of ringgit against the US dollar expressed in units of ringgit, Rubber production is the total production of natural rubber in Indonesia, Thailand and Malaysia expressed in tons and the International Price is the value of natural rubber commodities on the global market expressed in units of US\$/Kg.

To analyze how the competitiveness of Indonesian, Thai, and Malaysian natural rubber exports in the global market, the Revealed Comparative Advantage (RCA) and Revealed Symmetric Comparative Advantage (RSCA) analysis tools are used which use the following formula.

$$RCA_N = \frac{XNi/XNt}{Wi/wt}$$

Where :

- RCA = Natural Rubber Competitiveness
- XNt = All Total Export Value (Indonesia, Thailand, and Malaysia)
- Wi = Export Value of Natural Rubber in the World
- Wt = World Total Export
- N = Indonesia, Thailand, and Malaysia

$$RSCA_N = \frac{RCA_N - 1}{RCA_N + 1}$$

Where :

- RSCA = Revealed Symmetric Comparative Advantage
- RCA = Revealed Comparative Advantage
- N = Indonesia, Thailand, dan Malaysia

To determine the effect of the independent variable on the dependent variable, this study uses the Ordinary Least Square (OLS) data analysis method with multiple linear regression. The mathematical equation model in this study is as follows:

$$RSCANT = \beta_0 + \beta_1KRt + \beta_2PKt + \beta_3HGt + et$$

Where :

- RSCA = Natural Rubber Competitiveness
- KR = Exchange Rate
- PK = Natural Rubber Production
- HG = Natural Rubber International Price
- N = Indonesia, Thailand, and Malaysia
- $\beta_0$  = Constant
- $\beta_1 \beta_2 \beta_3$  = Variable Regression Coefficient KR,PK,HG
- et = Error Term
- t = Time series

## RESULTS AND DISCUSSION

### The Development of Exchange Rates of Three ITRC Countries

The development of the exchange rate during the period 1999 to 2020 had an average development for Indonesia of 3.31 percent, Thailand of -0.73 percent, while Malaysia was 0.69 percent. The appreciation of the rupiah occurred in 2010 which reached -12.50 percent, which

was Rp. 9,090/USD from the previous year, which was Rp. 10,389, while the appreciation of Bath occurred in 2017 which reached -8.93 percent, which was 32.794/USD from the previous year. which is 36,012, and the Ringgit appreciation occurred in 2017 which reached -9.03 percent which was RM 4,079/USD from the previous year which was RM 4,484. For more information, see table 1.

**Table 1**  
ITRC Country Exchange Rate Development 1999-2020

Year	IND (Rp)	Growth (%)	THA (฿)	Growth (%)	MLY (RM)	Growth (%)
1999	7.855	-	37,814	-	3,8	-
2000	8.421	7,20	40,112	6,08	3,8	0
2001	10.260	21,83	44,432	10,77	3,8	0
2002	9.311	-9,24	42,96	-3,31	3,8	0
2003	8.577	-7,88	41,485	-3,43	3,8	0
2004	8.938	4,20	40,222	-3,04	3,8	0
2005	9.704	8,57	40,22	-0,0049	3,787	-0,34
2006	9.159	-5,61	37,882	-5,81	3,668	-3,14
2007	9.141	-0,19	34,518	-8,88	3,438	-6,27
2008	9.698	6,09	33,313	-3,49	3,336	-2,96
2009	10.389	7,12	34,286	2,92	3,525	5,66
2010	9.090	-12,50	31,686	-7,58	3,221	-8,62
2011	8.770	-3,52	30,492	-3,77	3,06	-4,99
2012	9.386	7,02	31,083	1,93	3,089	0,94
2013	10.461	11,45	30,726	-1,14	3,151	2,007
2014	11.865	13,42	32,981	7,33	3,495	10,92
2015	13.389	12,84	36,17	9,66	4,292	22,80
2016	13.308	-0,60	36,012	-0,43	4,484	4,47
2017	13.380	0,54	32,794	-8,93	4,079	-9,03
2018	14.236	6,39	32,554	-0,73	4,185	2,59
2019	14.147	-0,62	30,1624	-7,34	4,113	-1,72
2020	14.582	3,07	31,294	3,75	4,203	2,19
<b>Average</b>		<b>3,31</b>	<b>Average</b>	<b>-0,73</b>	<b>Average</b>	<b>0,69</b>

Source: World Bank, 2020 (diolah)

### The Development of Natural Rubber Production in Three ITRC Countries

The highest natural rubber production for Indonesia was in 2017 which was 3,700,000 tons, while for Thailand it was in 2019 which was 4,839,952 tons, and for Malaysia it was in 2006 which was 1,283,640 tons. Increased production of natural rubber produced for each country as a result of maximum land use and farming methods that use more advanced technology, as well as the use of superior seeds so that the resulting production continues to increase. For more information, see Table 2.

**Table 2**  
**Development of Natural Rubber Production in Three ITRC Countries 1999-2020**

Year	IND (Rp)	Growth (%)	THA (฿)	Growth (%)	MLY (RM)	Growth (%)
1999	1.600.000	-	2.048.156	-	768.900	-
2000	1.500.000	-6,25	2.278.653	11,25	927.600	20.64
2001	1.600.000	6,67	2.522.508	10,70	882.000	-4.91
2002	1.600.000	0	2.633.124	4,38	889.800	0.88
2003	1.800.000	12,5	2.860.093	8,61	985.600	10.76
2004	2.100.000	16,67	3.006.720	5,12	1.168.735	18.58
2005	2.300.000	9,52	2.979.722	-0,89	1.126.023	-3.65
2006	2.600.000	13,04	3.070.520	3,04	1.263.640	12.22
2007	2.800.000	7,69	3.024.207	-1,50	1.199.571	-5.07
2008	2.800.000	0	3.166.910	4,71	1.072.373	-10.6
2009	2.400.000	-14,28	3.090.280	-2,41	852.286	-20.52
2010	2.700.000	12,5	3.051.781	-1,24	939.244	10.2
2011	3.000.000	11,11	3.348.897	9,73	996.337	6.08
2012	3.000.000	0	4.139.403	23,60	923.020	-7.36
2013	3.200.000	6,67	4.305.069	4,00	826.424	-10.46
2014	3.200.000	0	4.566.260	6,06	668.613	-19.09
2015	3.100.000	-3,125	4.466.063	-2,19	722.122	8.002
2016	3.400.000	9,67	4.519.000	1,18	673.513	-6.73
2017	3.700.000	8,82	4.503.101	-0,35	740.138	9.89
2018	3.600.000	-2,70	4.813.527	6,89	603.329	-18.48
2019	3.500.000	-2,78	4.839.952	0,55	639.830	6.05
2020	2.800.000	-20	4.703.171	-2,82	514.702	-19.55
<b>Average</b>		<b>3,12</b>	<b>Average</b>	<b>4,21</b>	<b>Average</b>	<b>-1,10</b>

Source : Ministry of Agriculture, BPS, and Knoema 2020 (processed)

### Development of International Natural Rubber Prices

In general, international prices for natural rubber tend to fluctuate, with an average increase of 0.08 percent per year in the period 1999 to 2020. To clarify the development of international prices for natural rubber, see table 3 below:

**Table 3**  
**Development of International Rubber Prices 1999-2020**

Year	International Price (US\$)	Growth (%)
1999	0,62	-
2000	0,66	6,45
2001	0,57	-13,63
2002	0,76	33,33
2003	1,08	42,10
2004	1,28	18,52
2005	1,48	15,62
2006	2,07	39,86
2007	2,26	9,18
2008	2,58	14,15
2009	1,91	-25,96
2010	3,65	91,09
2011	4,82	32,05
2012	3,37	-30,08
2013	2,79	-17,21

Year	International Price (US\$)	Growth (%)
2014	1,95	-30,11
2015	1,57	-19,49
2016	1,6	1,91
2017	1,99	24,37
2018	1,56	-21,61
2019	1,64	5,13
2020	1,72	4,88
<b>Average</b>		<b>8,59</b>

Source: International Rubber Study Group, 2020 (processed)

### The Development of Export Values of the Three ITRC Countries

The development of the export value of natural rubber for the three ITRC countries, namely Indonesia, Thailand, and Malaysia, tends to fluctuate. The average development of export value for Indonesia is 13.03 percent, Thailand is 10.35, and Malaysia is 7.78 percent. The development of Indonesia's highest export value was in 2010 at 125.93 percent or US\$ 7,329.059,531 from the previous year, which was US\$ 3,243,980,375. Meanwhile, Thailand's highest export value development was in 2010 amounting to 83.29 percent or US\$ 7,896,026,144 from the previous year of 4,308,003,166 US\$. And for Malaysia, the highest export value development was in 2010 amounting to 126.00 percent worth 2,863,577,963 US\$ from the previous year of 1,267,076,401 US\$. For more information, see table 4 below.

**Table 4**  
**Development of Natural Rubber Export Value of Three ITRC Countries 1999-2020**

Year	IND (Rp)	Growth (%)	THA (฿)	Growth (%)	MLY (RM)	Growth (%)
1999	850.025.926	-	1.158.919.119	-	616.681.924	-
2000	889.302.047	4,62	1.509.413.295	30,24	676.674.048	9,73
2001	786.614.651	-11,55	1.321.208.234	-12,5	496.450.586	-26,6
2002	1.038.387.242	32,01	1.737.761.985	31,53	655.783.597	32,09
2003	1.494.625.477	43,94	2.796.829.733	60,94	942.821.997	43,77
2004	2.181.251.502	45,94	3.414.560.327	22,09	1.371.326.452	45,45
2005	2.583.963.397	18,46	3.694.645.454	8,20	1.528.476.296	11,46
2006	4.322.294.402	67,27	5.430.350.086	46,98	2.246.584.099	46,98
2007	4.870.512.966	12,68	5.640.502.534	3,87	2.135.471.121	-4,95
2008	6.058.244.156	24,39	6.720.963.567	19,16	2.431.235.121	13,85
2009	3.243.980.375	-46,45	4.308.003.166	-35,9	1.267.076.401	-47,9
2010	7.329.059.531	125,93	7.896.026.144	83,29	2.863.577.963	126,0
2011	11.766.242.477	60,54	13.176.350.047	66,87	4.339.680.158	51,55
2012	7.864.528.092	-33,16	8.745.795.141	-33,6	2.545.684.448	-41,3
2013	6.910.663.082	-12,13	8.233.509.883	-5,86	2.228.361.269	-12,5
2014	4.744.753.073	-31,34	6.021.541.373	-26,9	1.398.026.002	-37,3
2015	3.701.477.560	-21,99	5.056.609.303	-16,0	1.034.130.807	-26,0
2016	3.372.318.952	-8,89	4.445.474.149	-12,1	871.121.130	-15,8
2017	5.105.304.706	51,39	6.024.492.282	35,52	1.100.656.982	26,35
2018	3.951.451.411	-22,60	4.602.169.782	-23,6	935.092.874	-15,0
2019	3.527.202.231	-10,74	4.142.531.651	-9,99	910.546.972	-2,62
2020	3.011.839.751	-14,61	3.525.149.550	-14,9	784.565.441	-13,8
<b>Average</b>		<b>13,03</b>	<b>Average</b>	<b>10,35</b>	<b>Average</b>	<b>7,78</b>

Source : UN Comtrade 2020 (processed)

## Development of World Natural Rubber Export Value

The development of the export value of natural rubber for the three ITRC countries, namely Indonesia, Thailand, and Malaysia, tends to fluctuate. The average development of export value for Indonesia is 13.03 percent, Thailand is 10.35, and Malaysia is 7.78 percent. The development of Indonesia's highest export value was in 2010 at 125.93 percent or US\$ 7,329.059,531 from the previous year, which was US\$ 3,243,980,375. Meanwhile, Thailand's highest export value development was in 2010 amounting to 83.29 percent or US\$ 7,896,026,144 from the previous year of 4,308,003,166 US\$. And for Malaysia, the highest export value development was in 2010 amounting to 126.00 percent worth 2,863,577,963 US\$ from the previous year of 1,267,076,401 US\$. For more information, see table 4 below.

**Table 5**  
**Development of World Natural Rubber Export Value**

Year	World Natural Rubber Export Value	Growth (%)
1999	3.213.361.121	-
2000	3.833.009.949	19,28
2001	3.273.548.130	-14,59
2002	4.296.571.328	31,25
2003	6.458.368.419	50,31
2004	8.502.350.145	31,64
2005	9.673.839.662	13,77
2006	14.822.166.018	53,21
2007	16.039.038.204	8,20
2008	19.508.753.529	21,63
2009	11.635.813.270	-40,35
2010	24.272.755.408	108,60
2011	45.418.115.421	87,11
2012	35.663.409.499	-21,47
2013	25.601.973.304	-28,21
2014	16.676.983.280	-34,86
2015	13.093.088.791	-21,49
2016	11.695.103.818	-10,67
2017	16.155.956.006	38,14
2018	12.991.703.781	-19,58
2019	12.310.362.026	-5,24
2020	9.608.611.436	-21,94
<b>Average</b>		<b>11,65</b>

Source : UN Comtrade 2020 (processed)

## Natural Rubber Competitiveness Based on Comparative Advantage

The following are the results of processing the competitiveness of natural rubber using Revealed Comparative Advantage (RCA):

**Table 6**  
**Calculation Results of Natural Rubber Competitiveness with Revealed Comparative Advantage (RCA) in Three ITRC Countries for the period 1999-2020**

Year	ITRC Three Countries RCA Value		
	RCAI	RCAT	RCAM
1999	29.72	33.76	12.41
2000	23.45	35.94	11.28
2001	25.83	37.65	10.43
2002	26.94	37.84	10.42
2003	28.23	40.16	10.36
2004	32.29	37.59	11.47
2005	31.63	35.19	11.31
2006	34.31	33.27	11.18
2007	36.16	31.11	10.28
2008	35.46	30.64	9.81
2009	29.24	29.67	8.46
2010	28.51	24.81	8.84
2011	22.78	22.69	7.53
2012	20.69	19.05	5.59
2013	27.42	26.1	7.07



Year	ITRC Three Countries RCA Value		
	RCAI	RCAT	RCAM
2014	29.83	29.28	6.6
2015	30.33	29.07	6.36
2016	31.27	27.65	6.16
2017	32.3	27.19	5.4
2018	31.94	26.55	5.5
2019	31.07	26.19	5.65
2020	32.6	26.93	5.92
<b>Average</b>	<b>29.64</b>	<b>30.38</b>	<b>8.55</b>

Source : UN Comtrade 2020 (processed)

Based on the table, it can be seen that the results of the analysis using RCA (Revealed Comparative Advantage) indicate that the three ITRC countries, namely Indonesia, Thailand, and Malaysia, have competitiveness in the global market. It can be seen that the RCA value which states that the RCA number for natural rubber in Indonesia, Thailand, and Malaysia is greater than one. The average growth rate of natural rubber RCA during the period 1999 to 2020 for Indonesia is 29.64 per year, Thailand is 30.38 per year, and Malaysia is 8.55 per year. Then, in addition to the calculation of RCA, the calculation of competitiveness is carried out using Revealed Symmetric Comparative Advantage (RSCA) as follows:

**Table 7**  
**Calculation of the Value of Natural Rubber Export Competitiveness with Revealed Symmetric Comparative Advantage (RSCA) in Three ITRC Countries for the period 1999-2020**

Year	ITRC Three-Country RSCA Value		
	RSCAI	RSCAT	RSCAM
1999	0.934	0.942	0.85
2000	0.918	0.945	0.837
2001	0.925	0.948	0.825
2002	0.928	0.948	0.824
2003	0.931	0.951	0.823
2004	0.939	0.948	0.839
2005	0.938	0.944	0.837
2006	0.943	0.941	0.835
2007	0.946	0.937	0.822
2008	0.945	0.936	0.815
2009	0.933	0.934	0.788
2010	0.932	0.922	0.796
2011	0.915	0.915	0.765
2012	0.907	0.9	0.696
2013	0.929	0.926	0.752
2014	0.935	0.933	0.737
2015	0.936	0.933	0.728
2016	0.938	0.93	0.72
2017	0.939	0.929	0.687
2018	0.939	0.927	0.692
2019	0.937	0.926	0.699
2020	0.94	0.928	0.711
<b>Average</b>	<b>0.9330</b>	<b>0.9338</b>	<b>0.7763</b>

Source : UN Comtrade 2020 (processed)

In the table it can be seen that the results of the analysis show that in general the natural rubber commodities of the three ITRC countries have competitiveness in the global market. This can be seen based on the results of the RSCA calculation which determined that the RSCA values

for Indonesia, Thailand and Malaysia were at a value > 0. The average RSCA growth for each country during the period 1999 to 2020 was 0.9330 per year for Indonesia. , with the potential for second place which has the competitiveness of the three ITRC countries, this is because the cultivating industry for Indonesian natural rubber is still minimal, the advantages are still primary products while for processed rubber products are still limited, as well as the lack of domestic processing facilities and the limited manufacturing industry that can be used. growing well. Meanwhile, Thailand is 0.9338 per year, with the highest competitiveness of the three ITRC countries as evidenced by the Thai government's efforts to pay close attention to the development of rubber plants and trying to carry out an expansion to expand rubber plantations in Thailand, this can be seen from continuing to innovate through institutions. a research called Thailand Rubber Research Institute, and for Malaysia it is 0.7763 per year with the lowest competitiveness position among the three ITRC countries, this can be seen from the decline in the productivity of Malaysian natural rubber due to the limited land available for Malaysian natural rubber, thereby reducing the amount of natural rubber available. Malaysia's own natural rubber exports.

### The Result of Regression Estimation of the Effect of Exchange Rate, Production, and Prices on Competitiveness

This study describes the relationship between export competitiveness for natural rubber from three ITRC countries, namely Indonesia, Thailand, and Malaysia with the Exchange Rate, Total Production, and International Natural Rubber Prices during the period 1999 to 2020. To find out and analyze The relationship and influence between variables used multiple regression analysis tools using eviews 10. Based on the results of cultivation that has been carried out using the computer application eviews 10, the results of the equations for each country are as follows:

$$RSCA_{Nt} = \beta_0 + \beta_1KR_{Nt} + \beta_2PK_{Nt} + \beta_3HG_{t+e_t}$$

The following are the results of multiple linear regression testing for Indonesia based on the above model:

**Table 8**  
Multiple linear regression test results for Indonesia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.929963	0.011478	81.01848	0.0000
KRI	-1.45E-06	1.88E-06	-0.771491	0.4504
PKI	1.20E-08	6.86E-09	1.750914	0.0970
HG	-0.006958	0.003257	-2.136301	0.0466
R-squared	0.300145	Mean dependent var		0.933045
Adjusted R-squared	0.183502	S.D. dependent var		0.009722
S.E. of regression	0.008785	Akaike info criterion		-6.468570
Sum squared resid	0.001389	Schwarz criterion		-6.270199
Log likelihood	75.15427	Hannan-Quinn criter.		-6.421840
F-statistic	2.573201	Durbin-Watson stat		1.012321
Prob(F-statistic)	0.086066			

Source: Data processed, 2022

Based on the test results in Table 8, the regression equation can be written as follows:

$$RSCA_{it} = 0.929963 - 0.00000145 KRI + 0.000000120 PKI - 0.006958 HG$$

$$P_{.value} = (0.0000) (0.4504) (0.0970) (0.0466)$$

The results of the regression of the exchange rate variable obtained a coefficient of - 0.00000145. This means that if the value of other independent variables is considered constant or unchanged, then every 1 rupiah increase in the exchange rate will reduce the export power of natural rubber by 0.00000145.

The results of the production variable regression obtained a coefficient of 0.0000000120. This means that if the value of other independent variables is considered constant or unchanged, then every 1 tonne increase in Indonesian natural rubber production will increase competitiveness by 0.0000000120.

The results of the regression of the international natural rubber price variable obtained a coefficient of -0.006958. This means that if the value of other independent variables is considered constant or unchanged, then every US\$ 1 increase in the international price of natural rubber will reduce competitiveness by 0.006958.

Based on the results of Indonesian multiple linear regression for the F-statistical test, the results for the F-count are 2.573201 with a probability of 0.086066 or greater than =5% (0.086066 > 0.05). Thus, it can be concluded that H0 is accepted and H1 is rejected, which identifies that the exchange rate (exchange rate), the amount of production, and the international price of natural rubber together have no effect on the competitiveness of Indonesia's natural rubber exports.

Seeing the results of each independent variable on the dependent variable partially tested with the t-test in detail, it can be seen as follows: (1) T-statistical test for the exchange rate variable (exchange rate), that the t-statistic value for the exchange rate variable (exchange rate) equal to - 0.771491 with the probability of the exchange rate variable (exchange rate) of 0.4504 or greater than the value of =5% (0.4504>0.05), then H0 is accepted and H1 is rejected, which indicates that the exchange rate variable has no significant effect on the competitiveness of natural rubber exports. Indonesia; (2) The t-statistical test for the Indonesian natural rubber production variable, that the t-statistic value for the production variable is 1.750914 with a production variable probability of 0.0970 or greater than =5% (0.0970>0.05), then H0 is accepted and H1 is rejected, which indicates that the production variable has no significant effect on the competitiveness of Indonesia's natural rubber exports; (3) The t-statistical test for the international natural rubber price variable, that the t-statistic value for the international natural rubber price variable is - 2.136301 with the probability of the international natural rubber price variable being 0.0466 or less than =5% (0.0466<0.05) , then H0 is rejected and H1 is accepted, which indicates that the international natural rubber price variable has a significant effect on the competitiveness of Indonesia's natural rubber exports.

Based on the results of the regression coefficient of determination (R-squared) of 0.300145, which is around 30 percent of the variable competitiveness of Indonesia's natural rubber exports is influenced by the exchange rate (exchange rate), production, and international prices of natural rubber and 70 percent is influenced by other factors that are not investigated in this study. Furthermore, the following are the results of multiple linear regression testing for Thailand based on a predetermined model:

**Table 9**  
**Multiple linear regression test results for Thailand**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.917786	0.031934	28.73980	0.0000
KRT	0.001028	0.000638	1.610696	0.1246
PKT	-2.98E-09	2.22E-09	-1.346822	0.1948
HG	-0.005259	0.002038	-2.580759	0.0188
R-squared	0.792034	Mean dependent var		0.933773
Adjusted R-squared	0.757373	S.D. dependent var		0.012228
S.E. of regression	0.006023	Akaike info criterion		-7.223485
Sum squared resid	0.000653	Schwarz criterion		-7.025113
Log likelihood	83.45833	Hannan-Quinn criter.		-7.176754
F-statistic	22.85084	Durbin-Watson stat		1.842026
Prob(F-statistic)	0.000002			

Source: Data processed, 2022

Based on the test results in Table 9, the regression equation can be written as follows:

$$\text{RSCAT}_t = 0.917786 + 0.001028 \text{ KRT} - 0.0000000298 \text{ PKT} - 0.005259 \text{ HG}$$

$$\text{P.value} = (0.0000) (0.1246) (0.1948) (0.0188)$$

The results of the regression of the exchange rate variable obtained a coefficient of 0.001028. This means that if the value of other independent variables is considered constant or unchanged, then every 1 rupiah increase in the exchange rate will increase the export power of natural rubber by 0.001028.

The results of the production variable regression obtained a coefficient of 0.0000000298. This means that if the value of other independent variables is considered constant or unchanged, then every 1 tonne increase in Thailand's natural rubber production will reduce competitiveness by 0.0000000298.

The results of the regression of the natural rubber international price variable obtained a coefficient of -0.005259. This means that if the value of other independent variables is considered constant or unchanged, then every US\$ 1 increase in the international price of natural rubber will reduce competitiveness by 0.005259.

Based on the results of multiple linear regression in Thailand for the F-statistical test, the results for the F-count are 22.85084 with a probability of 0.000002 or less than =5% ( $0.000002 < 0.05$ ). Thus, it can be concluded that  $H_0$  is rejected and  $H_1$  is accepted, which identifies that the exchange rate, production amount, and international price of natural rubber together affect the competitiveness of Thailand's natural rubber exports.

Seeing the results of each independent variable on the dependent variable partially tested with the t-test in detail, it can be seen as follows: (1) T-statistical test for the exchange rate variable (exchange rate), that the t-statistic value for the exchange rate variable (exchange rate) of 1.610696 with the probability of the exchange rate variable (exchange rate) of 0.1246 or greater than the value of =5% ( $0.1246 > 0.05$ ), then  $H_0$  is accepted and  $H_1$  is rejected, which indicates that the exchange rate variable has no significant effect on the competitiveness of Thailand's natural rubber exports. ; (2) The t-statistic test for the Thai natural rubber production variable, that the t-statistic value for the production variable is - 1.346822 with the probability of the production variable being 0.1948 or greater than =5% ( $0.1948 > 0.05$ ), then  $H_0$  is accepted and  $H_1$  rejected, which indicates that the production variable has no significant effect on the competitiveness of Thailand's natural rubber exports; (3) The t-statistical test for the international natural rubber price variable, that the t-statistic value for the international natural rubber price variable is - 2.580759 with the probability of the international natural rubber price variable being 0.0188 or less than =5% ( $0.0199 < 0.05$ ) , then  $H_0$  is rejected and  $H_1$  is accepted, which indicates that the international natural rubber price variable has a significant effect on the competitiveness of Thailand's natural rubber exports.

Based on the results of the regression coefficient of determination (R-squared) of 0.792034, which ranges from 79 percent of Thailand's natural rubber export competitiveness variable is influenced by the exchange rate (exchange rate), production, and international prices of natural rubber and 21 percent is influenced by other factors that are not investigated in this study. Furthermore, the following are the results of multiple linear regression testing for Malaysia based on a predetermined model:

**Table 10**  
Multiple linear regression test results for Malaysia

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.904909	0.124621	7.261303	0.0000
KRM	-0.057992	0.024899	-2.329105	0.0317
PKM	1.81E-07	3.72E-08	4.871037	0.0001
HG	-0.038037	0.008346	-4.557295	0.0002
R-squared	0.786939	Mean dependent var		0.776273
Adjusted R-squared	0.751429	S.D. dependent var		0.058003
S.E. of regression	0.028918	Akaike info criterion		-4.085718
Sum squared resid	0.015053	Schwarz criterion		-3.887347
Log likelihood	48.94290	Hannan-Quinn criter.		-4.038988
F-statistic	22.16097	Durbin-Watson stat		1.646657
Prob(F-statistic)	0.000003			

Source: Data processed, 2022

Based on the results of table 10 testing, the regression equation can be written as follows:

$$\mathbf{RSCAM}_t = 0.904909 - 0.057992 \text{ KRM} + 0.000000181 \text{ PKM} - 0.038037 \text{ HG}$$

$$\mathbf{P.value} = (0.0000) (0.0317) (0.0001) (0.0002)$$

The results of the regression of the exchange rate variable obtained a coefficient of -0.057992. This means that if the value of other independent variables is considered constant or unchanged, then every 1 rupiah increase in the exchange rate will reduce the export power of natural rubber by 0.057992.

The results of the production variable regression obtained a coefficient of 0.000000181. This means that if the value of other independent variables is considered constant or unchanged, then every 1 tonne increase in Malaysian natural rubber production will increase competitiveness by 0.000000181.

The results of the regression of the international natural rubber price variable obtained a coefficient of -0.038037. This means that if the value of other independent variables is considered to be constant or unchanged, every US\$ 1 increase in the international price of natural rubber will reduce competitiveness by 0.038037.

Based on the results of Malaysia's multiple linear regression for the F-statistical test, the results for the F-count are 22.16097 with a probability of 0.000003 or less than =5% (0.000003 < 0.05). Thus, it can be concluded that H0 is rejected and H1 is accepted, which identifies that the exchange rate, the amount of production, and the international price of natural rubber together affect the competitiveness of Malaysia's natural rubber exports.

Seeing the results of each independent variable on the dependent variable partially tested with the t-test in detail, it can be seen as follows: (1) T-statistical test for the exchange rate variable (exchange rate), that the t-statistic value for the exchange rate variable (exchange rate) of -2.329105 with the probability of the exchange rate variable (exchange rate) of 0.0317 or greater than the value of = 5% (0.0317 < 0.05), then H0 is rejected and H1 is accepted, which indicates that the exchange rate variable has no significant effect on the competitiveness of natural rubber exports. Malaysia; (2) The t-statistical test for the Malaysian natural rubber production variable, that the t-statistic value for the production variable is 4.871037 with the probability of the production variable being 0.0001 or greater than =5% (0.0001 < 0.05), then H0 is rejected and H1 is accepted. , which indicates that the production variable has a significant effect on the competitiveness of Malaysia's natural rubber exports; and (3) the t-statistical test for the international natural rubber price variable, that the t-statistic value for the international natural rubber price variable is -4.557295 with the probability that the international natural rubber price

variable is 0.0002 or less than  $\alpha=5\%$  ( $0.0002 < 0.05$ ), then  $H_0$  is rejected and  $H_1$  is accepted, which indicates that the international natural rubber price variable has a significant effect on the competitiveness of Malaysia's natural rubber exports.

Based on the results of the regression coefficient of determination (R-squared) of 0.786939, which is around 78 percent of the variable competitiveness of Malaysia's natural rubber exports is influenced by the exchange rate, production, and international prices of natural rubber and 22 percent is influenced by other factors that are not investigated in this study.

## CONCLUSION AND RECOMMENDATION

### Conclusion

Based on the results of research and discussion, several conclusions can be drawn that the competitiveness of natural rubber exports from the three ITRC countries for the period 1999 to 2020 is for Indonesia an average of 0.9330, while Thailand is 0.9338, and Malaysia is 0.7763. It can be interpreted that the potential for natural rubber export competitiveness of the three ITRC countries is quite high.

The results of multiple linear regression for each ITRC country show that the rupiah exchange rate against the dollar and production variables have no significant effect on the competitiveness of Indonesia's natural rubber exports, while the international price of natural rubber has a significant effect on the competitiveness of Indonesia's natural rubber exports. Meanwhile, the results of Thailand show that the exchange rate of Bath against the dollar and production variables have no significant effect on the competitiveness of Thailand's natural rubber exports, while the international price of natural rubber has a significant effect on the competitiveness of Thailand's natural rubber exports. And for Malaysia, it shows that the three variables, namely the ringgit exchange rate against the dollar, production, and international prices of natural rubber have a significant effect on the competitiveness of Malaysia's natural rubber exports.

### Recommendation

It is hoped that the governments of each ITRC country or work leaders will pay more attention to the policies that will be taken in increasing the "export competitiveness of Indonesia, Thailand and Malaysia" natural rubber, as well as paying attention to rubber farmers to improve the quality of Indonesian, Thai and Malaysian rubber products in order to improve the quality of rubber products. natural rubber of each country.

It is hoped that the governments of each ITRC country will be able to maintain their respective relatively stable exchange rates and pay attention to the international price of natural rubber so that each country gets high profits.

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