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ANALYSIS OF THE FACTORS AFFECTING RUBBER EXPORT VOLUMES NATURAL INDONESIA TO FIVE DESTINATION COUNTRIES

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ABSTRACT

Rubber is one of the non-oil and gas export commodities or plantations which plays a very important role in the Indonesian economy and is also one of the non-oil and gas commodities which contributes quite a large amount of foreign exchange.This research was conducted with the aim of analyzing the factors that influence the volume of Indonesian natural rubber exports to five destination countries, namely exchange rate, production amount, land area, international prices, GDP per capita of destination countries, and economic distance. This research was conducted in several destination countries, namely the United States, Japan, India, China and South Korea, which are the main destination countries for Indonesian natural rubber exports, because the volume of Indonesian natural rubber exports to these countries is the highest among several other countries. This research data is in the form of time series and cross section secondary data using annual data starting from the 2010 period to the 2022 period obtained from Central Statistics Agency, Directorate General of Indonesian Plantations, Export Commodity Analysis, Indexmundi, world bank, Center for Prospective Studies and International Information (CEPII), as well as related articles and journals. This research uses a data collection method, namely non-participant observation. The data analysis technique in this research is panel data regression analysis using Eviews 12 software. The results of this research show that exchange rates have a negative and significant effect on Indonesian natural rubber in the five destination countries. The amount of production has a positive and significant effect on Indonesian natural rubber in the five destination countries. Land area does not have a significant effect on Indonesian natural rubber in the five destination countries. International prices do not have a significant effect on Indonesian natural rubber in the five destination countries. GDP per capita of the destination country has a positive and significant effect on Indonesian natural rubber in the five destination countries. Economic distance has a negative and significant effect on Indonesian natural rubber to the five destination countries.

Keywords: Export volume, rubber, exchange rate, production amount, land area, international prices, GDP per capita of destination country, economic distance

INTRODUCTION

International trade in each country's economy has a very important role in improving world welfare. International trade itself can be interpreted as trade between countries which refers to exports and imports in the form of goods and services (Tambunan, 2001: 196).

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International trade is divided into two categories, namely trade in goods and trade in services. International trade activities are carried out to improve the country's living standards (Schumacher, 2013). Opening up international trade will benefit the country concerned as a whole because the profits obtained exceed the losses (Mankiw, 2006: 221). International trade is carried out by countries that have mutually necessary relationships, or it can also occur because of diplomatic relations. One of the basic principles of international trade is that one should buy and provide services from the one country that has the lowest price and sell one's goods and services to the country that has the highest price. This is good for buyers and sellers because they have the opportunity to accelerate the pace of their economic development, including Indonesia (Vijayasri, 2013).

In the Indonesian economy, international trade has provided direct benefits to the trade sector for all domestic production and also contributed to providing or opening up employment opportunities. Exports are a very important source of foreign exchange earnings in a country and also function as a means of financing for efforts to maintain economic stability and implement development. With increased development, the need for foreign exchange will increase, therefore the volume of exports must continue to be increased for the economy to encourage domestic economic growth. If you export, you will get foreign exchange which can be used to finance imports and finance the development of domestic sectors (Nehen, 2010: 484). One of the advantages of international trade is that through exports a country can obtain foreign exchange reserves, which can then be used for import purposes (Batubara et al., 2015). According to Bustami (2017), Indonesia continues to strive to increase export activities to support economic growth and achieve a better economy. Rapid export expansion is a key factor in Indonesia's rapid economic growth (Athukorala, 2006).

Indonesia's economic development cannot be separated from economic changes in other countries and the world (Pramana and Meydianawathi, 2013). Indonesia is one of the countries that has a comparative advantage, namely as an agricultural and maritime country. Comparative advantage is the basis of the economy that needs to be developed in order to become a competitive advantage. As an agricultural country with abundant natural wealth, Indonesia has sufficient land area and a suitable climate for farming. The majority of Indonesia's population works in the agricultural sector, therefore Indonesia is also called an agricultural country (Arifin, 2013).

The agricultural sector is the answer to the problems of unemployment and poverty. By optimizing agricultural land with appropriate farming efforts, it is hoped that farmers can improve the welfare of farmers' lives. Rubber farmers, when carrying out their farming business, of course hope that any capital spent will produce high profits (income). Farmers need to calculate profit or loss by making an economic analysis. From this analysis, farmers can find out how much capital they have to sacrifice and farmers can also find out how much income they will earn (Gustina, 2014).

Table 1. Development of Export Volume of Indonesian Plantation Commodities (Thousand Tons) 2010-2022

No	Year	Export Volume of Indonesian Plantation Commodities (Thousand Tons)									
		Coconut Palm	Rubber	Coconut	Coffee	Cocoa	Guava Cashew	Clove	Pepper	Tea	Nutmeg
1	2010	16291.9	2351.9	1045.3	433.6	552.9	45.6	6	62.6	87.1	14.2
2	2011	16436.2	2556.2	1199.8	346.5	410.3	46	5.4	36.5	75.5	15
3	2012	18850.8	2444.5	1651.6	448.6	387.8	62.6	5.9	62.6	70.1	12.8
4	2013	20578	2702	1295.4	534	414.1	52.3	5.2	47.9	70.8	13.6
5	2014	22892.4	2623.5	1711.6	384.8	333.7	22	9.1	34.7	66.4	14.7
6	2015	26467.6	2630.3	1826.3	502	355.3	104.6	12.9	58.1	61.9	17
7	2016	22761.8	2578.8	1564.3	414.7	330	70.3	12.8	53.1	51.3	15.8
8	2017	27353.7	2991.9	1875.2	467.8	354.8	62.8	9.1	42.7	54.2	19.9
9	2018	27898.9	2812.1	1983,8	280	380.8	58.4	20.2	47.6	49	20.2
10	2019	28279.4	2503.7	1878.9	359.1	358.5	90.6	26	51.8	42.8	20
11	2020	25935.6	2279.9	2104.7	379.4	377.2	85.6	47.8	58.4	45.3	22.8
12	2021	26990.6	2385.2	2028.3	387.3	382.7	61.7	20.1	37.7	42.7	26.5

Source: Director General of Plantations, Ministry of Agriculture, Republic of Indonesia, 2023

In Table 1 it can be seen that the volume of exports of Indonesian plantation commodities, namely rubber, is in second place after palm oil. The export volume of Indonesian plantation commodities, namely rubber, from 2010-2022 has increased from year to year. This means that rubber plays a role in the economy in Indonesia. Rubber also plays a role in contributing to the country's foreign exchange from the non-oil and gas export sector, and providing industrial raw materials. Rubber is one of the national plantation commodities which has quite promising market opportunities. Apart from local consumption, rubber in Indonesia is also one of the leading export commodities. Currently, rubber is being developed in almost every region in the country (Juliansyah and Riyono, 2018).

Rubber is known for its good quality, rubber is a commodity that is used in many products and equipment throughout the world (from industrial to household products). Indonesia has enormous potential to develop processed rubber products where Indonesia's rubber plant population is in second place in the world (Wanda and Kartika, 2021). Indonesia is one of the countries that has the largest rubber plantations in the world. In fact, the area of rubber plantations owned by Indonesia exceeds the area of rubber plantations owned by the largest rubber producing countries, namely Thailand and Malaysia. However, in reality, even though Thailand has rubber plantations that are not as big as Indonesia, it is capable of producing rubber production greater than Indonesia. This is due to the low production of rubber produced, especially plantations owned by the people and only being able to provide 79.3 percent of the total national rubber production, and what is produced by the community is still sold in chunks and the quality is still relatively low, this is because when Currently, the people's rubber processing industry has not yet developed. Currently there are six countries that sell the

largest rubber production in the world, namely Indonesia, Malaysia, China, Vietnam, India and Thailand (Devi, 2015).

In Indonesia there are two types of exports, namely oil and gas exports and non-oil and gas exports. Oil and gas exports are sales of oil and gas goods abroad, through payment terms made in foreign currency. Oil and natural gas are very valuable and strategic natural resources because they can play a role in meeting world energy needs. Non-oil and gas exports are sales of goods other than petroleum and gas products to other countries and payment is made in foreign currency. Non-oil and gas exports refer to export activities of goods or services that are not included in the oil and gas commodity category such as oil and natural gas. Non-oil and gas exports come from crafts, livestock, agriculture, plantations and fisheries (Maya and Damanik, 2017).

Table 2. Indonesian Oil and Gas and Non-Oil and Gas Export Volume (Thousand Tons) Year 2010-2022

No	Year	Oil and Gas		Non Oil and Gas	
		Volume (Thousand Tons)	Enhancement (%)	Volume (Thousand Tons)	Enhancement (%)
1	2010	55,925.1	-	422,921.7	-
2	2011	59,053.9	5.59	523,165.9	23.7
3	2012	48,446.0	-17.96	551,690.6	5.45
4	2013	44,041.9	-9.09	655,963.2	18.9
5	2014	41,743.1	-5.22	507,722.4	-22.6
6	2015	44,964.7	7.72	463,862.5	-8.64
7	2016	43,328.8	-3.64	468,399.3	0.98
8	2017	42,505.0	-1.9	503,341.6	7.5
9	2018	37,055.5	-12.8	571,852.0	13.6
10	2019	26,528.2	-28.4	627,946.2	9.8
11	2020	27,497.9	3.7	552,180.3	-12.1
12	2021	28,890.2	5.1	594,777.6	7.7
13	2022	24,242.5	-16.09	622,431.4	4.7

Source: Central Statistics Agency (Processed Data), 2024

In Table 2 it can be seen that during the 2010-2022 period the volume of non-oil and gas exports was greater than the volume of oil and gas exports. The volume of oil and gas and non-oil and gas exports fluctuates greatly every year. This happens because if the exchange rate strengthens or increases, oil and gas exports will decrease, then competitiveness will also decrease and vice versa, if the exchange rate weakens, oil and gas exports will increase and competitiveness will also increase (Saffira, 2021). The weakening exchange rate is an incentive for companies to increase their exports, this is because domestic commodities will become cheaper for foreign consumers (importers).

Table 3. Export Growth of Non-Oil and Gas Products 2010-2022

No	Year	Non-Oil and Gas Product Export Growth (%)				
		Non Oil and Gas	Agriculture, Forestry and Fisheries	Processing industry	Mining	Other
1	2010	33.08	12.25	33.3	35.64	-2.8
2	2011	24.88	-6.13	24.71	29.69	39.9
3	2012	-5.54	6.16	-4.74	3.56	3.56
4	2013	-2.04	0.02	-2.5	-0.54	2.07
5	2014	-2.64	-6.26	3.99	-26.73	-12.16
6	2015	-9.71	10.47	-9.31	-12.16	-8.67
7	2016	0.18	-9.98	1.75	-6.64	-17.67
8	2017	15.95	9.43	13.21	33.8	19.3
9	2018	6.37	-6.54	4.01	20.5	0.7
10	2019	-4.27	5.29	-2.11	-14.99	13.93
11	2020	-0.61	14.02	2.91	-20.75	-25.51
12	2021	41.58	2.99	35.18	92.14	49.89
13	2022	25.78	15.4	16.29	71.3	-12.78

Source: Export Commodity Analysis, 2024

In Table 3 it can be seen that the growth in exports of non-oil and gas products fluctuates greatly every year. In 2022, the agriculture, forestry and fisheries sectors will increase by 15.4 percent from the previous year, while other non-oil and gas sectors such as mining experience a decline but the agriculture, forestry and fisheries sectors as well as the processing industry experience an increase. In 2021, the agriculture, forestry and fisheries sectors experienced a decline of 2.99 percent from the previous year. While other non-oil and gas sectors such as the processing industry and mining are experiencing an increase, the agriculture, forestry and fisheries sectors are experiencing a decline. This happened because of the decline in bird nests and fruit commodities. In 2021, non-oil and gas sector exports increased by 41.48 percent, this happened because the fuel and animal oil or vegetable oil subsectors experienced an increase (Sembiring, 2021). In the processing industry sector there was an increase of 35.18 percent, this happened because the food and beverage industry subsector experienced an increase. In the mining sector, there was an increase of 92.14 percent, this happened because one of the mining subsectors, namely metal ore, slag and ash, experienced an increase. The increase in exports of metal ore, slag and ash was driven by the increase in international copper prices amidst the Covid-19 pandemic. With the increase in international copper prices, the value of Indonesia's exports of metal ore, slag and ash to the world has also increased (Puspandari*et al*., 2022).

One of the non-oil and gas sectors is Indonesian plantation products which play an important role in exports, namely natural rubber. Natural rubber is an important agricultural commodity both internationally and especially for Indonesia. In Indonesia, rubber is one of the

leading agricultural products because it supports the country's economy. Rubber also plays a role in contributing foreign exchange earnings, employment opportunities, providing industrial raw materials and so on. In fact, Indonesia once dominated world rubber production by beating other countries and the country of origin of the rubber plant itself on mainland South America (Permana and Izzaty, 2010).

Rubber occupies the second position in commodity production and export value after palm oil. Rubber consists of two types, namely synthetic rubber and natural rubber. Synthetic rubber is rubber made from raw materials derived from petroleum, coal, oil, natural gas and acetylene. Synthetic rubber can be changed in composition so that it is obtained directly from real rubber plants. There are several advantages to the quality of natural rubber, namely that it has perfect elasticity, good plasticity, is easy to process, does not wear out easily (does not wear out easily due to friction), making it easier to process and has high resistance to heat and cracking. Currently, natural rubber production and consumption are far below synthetic rubber, but in fact natural rubber cannot yet be replaced by synthetic rubber (Wahyudy et al., 2018).

Rubber is one of the non-oil and gas export commodities or plantations which plays a very important role in the Indonesian economy and is also one of the non-oil and gas commodities which contributes quite a large amount of foreign exchange. Indonesia is one of the largest rubber producers besides Malaysia and Thailand. This commodity also contributes to efforts to increase foreign exchange growth. In research, Amiruddin et al., (2022) stated that Indonesian natural rubber commodities have strong competitiveness in international trade, based on research results, Indonesian natural rubber has a comparative advantage in the markets of the United States, Japan, China, India and South Korea.

Based on Table 4, it can be seen that the volume of Indonesian natural rubber exports during 2010-2022 is very fluctuating, but in recent years the volume of Indonesian natural rubber exports has decreased. The export volume of natural rubber is greater than the export volume of synthetic rubber. FromTable 3It can also be seen that the largest percentage increase in the volume of Indonesian natural rubber exports occurred in 2017 at 16 percent, this happened because Indonesian natural rubber production increased so that Indonesian natural rubber exports also increased (Wirawan and Indrajaya, 2012). However, in 2022, Indonesia's natural rubber exports will decrease by -12.84 percent, this occurs because export destination countries shift their purchases to rubber producing countries where logistics costs are more competitive, including Thailand and Vietnam (Aulia, 2022).

Table 4. Indonesian Rubber Export Volume 2010-2022

No	Year	Indonesian Rubber Export Volume (Tons)			
		Rubber Natural	Enhancement (%)	Rubber Synthetic	Enhancement (%)
1	2010	2,350,640	-	17,949	-
2	2011	2,555,739	8.73	35,441	97.45
3	2012	2,444,438	-4.35	33,816	-4.59
4	2013	2,701,995	10.54	39,216	15.97

5	2014	2,623,425	-2.91	45,600	16.28
6	2015	2,630,313	0.26	51,347	12.6
7	2016	2,578,791	-1.96	90,820	76.87
8	2017	2,991,909	16	301.135	231.6
9	2018	2,812,105	-6.0	160,332	-46.8
10	2019	2,503,671	-11.0	174,939	9.1
11	2020	2,279,915	-8.9	279,448	59.7
12	2021	2,334,734	2,4	161,623	-42.2
13	2022	2,035,902	-12.84	152.122	-5.88

Source: Central Statistics Agency (Processed Data), 2024

Decreasing demand from major markets such as China and India is the main factor in the decline in the volume of Indonesian natural rubber exports. The largest percentage increase in the volume of Indonesian synthetic rubber exports occurred in 2017 at 231.6 percent, this occurred because international demand for synthetic rubber increased so that synthetic rubber exports also increased. However, in 2018, synthetic rubber exports decreased by -46.8 percent, this happened because synthetic rubber production in Indonesia generally depends on imports of raw materials such as butadiene and styrene. Apart from that, low investment in developing the synthetic rubber industry and lack of incentives from the government are obstacles that affect synthetic rubber production in Indonesia (Hertina et al., 2021).

In Putra and Apriliani's (2022) research, it was stated that in 2019, the top five importing countries for Indonesian natural rubber were the United States, Japan, China, India and South Korea. Total exports to the United States reached 554.26 thousand tons of Indonesia's total natural rubber exports (BPS, 2020). It could be said that the United States will definitely always import natural rubber in Indonesia. This is because the United States needs good quality rubber to make processed rubber materials of higher quality than its competitors (Putra and Apriliani, 2022). In second place is Japan, with exports of 505.13 thousand tons of Indonesia's total natural rubber. In third place is China, with exports of 220.26 thousand tons of Indonesia's total natural rubber exports. Ranked fourth is India with exports of 200.16 thousand tons of Indonesia's total natural rubber exports. Fifth place is Korea with exports of 169.25 thousand tons of Indonesia's total natural rubber exports.

Based on Table 5, the volume of Indonesian natural rubber exports based on export destination countries, it can be seen that during the last thirteen years the top five importing countries for Indonesian natural rubber were the United States, Japan, India, China and South Korea. It is also known that the United States and Japan continue to increase their imports of natural rubber, but if you look at India, China and South Korea, their imports of natural rubber have fluctuated. However, China's imports are higher than India and South Korea even though China experiences fluctuations (Rambe, ES 2020).

Table 5. Export Volume of Indonesian Natural Rubber by Destination Country Exports 2010-2022 (Thousand Tons)

No	Year	Indonesian Natural Rubber Export Volume (Thousand Tons)									
		United States of America	Japan	India	China	Korea South	Turkey	Spanish	Canada	Dutch	German
1	2010	546.1	312.9	99.2	418.1	91.5	55.5	43.1	69.5	61	57.5
2	2011	607.9	367.7	68.8	409.4	120.1	71.6	59.1	77.3	62.6	60.8
3	2012	572.3	389.2	107.9	437.8	142.7	55.1	39.6	76.7	43	59.8
4	2013	609.8	425.9	144.5	511.7	147.3	71.6	37	72	41	72.1
5	2014	597.8	409	195.8	367	158.7	75.8	33.9	73.8	36	74.8
6	2015	624.7	425.1	204.6	289.5	182.9	73	35.8	76.8	28.9	70.4
7	2016	577.7	421.7	231	302.9	179.6	70.8	29.8	74	25.3	70.2
8	2017	589.4	463.7	259	445.5	192.8	90	46.8	90.4	32.6	74.7
9	2018	606	483.7	302.9	252	483.7	94.9	39.1	89.9	29.3	70.4
10	2019	554.3	505.1	200.2	220.3	169.2	78.2	31.5	74.3	19.6	61.4
11	2020	449.7	388.3	188.6	330	149.6	82.5	25.7	74.7	20.4	49.4
12	2021	574.7	487.9	175.4	174.7	141.9	78.4	18	73.2	17.9	38.2

Source: Central Statistics Agency (Processed Data), 2023

There are several factors that can influence the volume of Indonesian natural rubber exports, one of which is the exchange rate.The exchange rate or what is usually called the exchange rate is the value or price of a country's currency compared with the currency of another country (Triyono, 2008). A country's currency exchange rate can experience strengthening (appreciation) or weakening (depreciation). When the domestic currency exchange rate depreciates, its value will weaken against the value of the foreign currency, meaning that the price of export commodities will become relatively cheaper and this will be followed by an increase in demand, and the volume of export commodities will increase accompanied by an increase in the value of exports. Conversely, when the domestic currency appreciates, its value will increase against the value of the foreign currency. If the value of the domestic currency experiences depreciation or appreciation, it will affect the price of exported commodities, which will have an impact on the export value of those commodities. According to Latief (2000:115) the United States Dollar exchange rate is used as an international currency exchange rate because it is an international standard currency whose value is relatively stable and is a strong currency so that it is accepted by anyone as a means of payment.

Another factor that influences the volume of Indonesian natural rubber exports is production. Indonesia's high production of natural rubber commodities increases the export volume of natural rubber commodities that will be exported. The higher the amount of abundant natural rubber production available in the country, the greater the supply of natural rubber commodities will be. The surplus of rubber commodities will increase the supply of

natural rubber owned by Indonesia, so that Indonesia's ability to carry out natural rubber export activities will be greater. SuperiorityIn order for Indonesia to increase natural rubber production for the future, there is still large enough tropical land available that is suitable for planting rubber trees.

Production plays a very important role in trade activities (Batubara et al., 2015). This is because when demand for goods to meet needs increases, production will also increase. When production increases, goods to meet needs will be available on the market so that trade activities will be able to run smoothly. However, when production decreases while demand for goods that meet needs increases, the availability of goods that meet people's needs will be limited, thereby hampering trade.

As a country rich in natural resources, Indonesia has abundant production factors. The abundant availability of production factors that Indonesia has makes Indonesia's natural rubber commodity production increase. Increased production of natural rubber commodities will result in abundant availability of Indonesian natural rubber commodities, so that the ability to export natural rubber commodities will also increase. This has caused the volume of Indonesian natural rubber exports to increase.

Another factor that influences the volume of Indonesian natural rubber exports is land area. Land area is the entire area where the planting is carried out or the planting process is carried out, land area is the amount or results that the farmer/planter will obtain. In general, it is said that the larger the area of land that is cultivated or planted, the more production will be produced from that land. Land expansion will increase production if the expansion has been carried out and is consistently fulfilled locally, then exports will occur. The relationship between land area and exports is that the larger the land area, the greater the harvest, then as production increases, natural rubber exports also increase (Segarani and Dewi, 2018).

Another factor that influences the volume of Indonesian natural rubber exports is international prices. According to Dharmesta and Irawan (2005:241) price is the amount of money needed to obtain a product and service. According to Budiarto (2007:147)Price is the exchange value of the benefits of a good for consumers and producers expressed in monetary units such as rupiah. In business, the price is determined by the seller or producer, so that the price is the amount of money that the buyer must give to the seller to obtain goods or services and the amount of money given is in accordance with the value of the goods or services.

International prices are the prices of goods that apply on the world market. The applicable price is the average price of rubber on the world market (Novianti and Hendratno, 2008). As an export commodity, the price of Indonesian rubber is very dependent on the price of rubber on the international market, which fluctuates greatly. The decline in world rubber prices since mid-1997 has encouraged the world's three main natural rubber producing countries, namely Thailand, Indonesia and Malaysia, to undertake tripartite cooperation in the field of rubber production and marketing. Along with the formation of tripartite cooperation between the three world rubber producing countries, rubber prices on the world market are showing an improving trend. After each member country implemented AETS (Agreed Export

Tonnage Scheme) and SMS (Supply Management Scheme), prices crept up (Purwaningrat et al., 2020).

Another factor that influences the volume of Indonesian natural rubber exports is the Gross Domestic Product (GDP) per capita of the destination country. GDP is the average income of the population in a country at a certain time, GDP per capita reflects the level of consumption or the level of people's purchasing power for goods and services (Mankiw, 2006: 5). According to Lembang and Pratomo (2013) GDP per capita is a proxy for people's purchasing power. GDP per capita has a positive influence on the exports of exporting countries. This means that the per capita expenditure of trading partner countries greatly influences the country's exports. This is in line with research conducted by (Wahyudi & Anggita, 2015) where it is explained that the higher a country's per capita income, the capacity to trade with other countries will increase, especially for imports. For Indonesia, when trading partner countries have an increase in GDP per capita, Indonesia can increase its exports.

The final factor that influences the volume of Indonesian natural rubber exports is the economic distance between Indonesia and the five destination countries. According to research conducted by Bekele and Mersha (2019), Larasati et al. (2018), and Hasibuan and Novianti (2022) explain that economic distance can influence the volume of a country's exports to its export destination countries. This is because distance is a proxy for the transportation costs that must be incurred in carrying out international trade (Krugman et al., 2018). The greater the distance between the exporting country and the importing country, the higher the transportation costs, which can affect the volume of exports carried out.

RESEARCH METHODS

This research design uses quantitative methods in associative form. This associative quantitative approach is used to determine the relationship between two or more variables (Sugiyono, 2013:57). This research is included in the type of quantitative research because it is based on quantitative data or findings achieved using statistical procedures or other methods of quantification (Rahyuda, 2004: 7). In this research, a simultaneous and partial analysis was carried out on the influence variables of the exchange rate, production quantity, land area, international prices, GDPper capitadestination countries, and economic distance to the volume of Indonesian natural rubber exports to the five destination countries.

RESULTS AND DISCUSSION

Data Analysis Results

Results of Descriptive Statistical Analysis

Descriptive statistical analysis in this research is used to provide a general description of the data used. Descriptive analysis in this research was carried out on independent variables, namely exchange rate (X1), production amount (X2), land area (X3), international prices (X4), GDP per capita of destination country (X5), economic distance (X6) and the dependent variable, namely Indonesian natural rubber export volume (Y) to five destination countries. The information displayed in the descriptive analysis is in the form of a description of the sample

used in the research in terms of the average (mean), median, maximum, minimum and standard deviation which can be seen in Table 6.

Table 6. Descriptive Analysis Results

	Y (Thousand Tons)	X1 (Rp)	X2 (Thousand Tons)	X3 (Thousand Ha)	X4 (USD/kg)	X5 (USD/ Billion)	X6 (Km)
Mean	335,060	7593,262	3195,200	3628,098	2.2654	28000.26	579,592
Median	330,000	10425.00	3145,400	3639,000	1.9200	29289.00	435,700
Maximum	624,700	15731.00	3680,400	3826,200	4.7500	76330.00	1619.80
Minimum	69.8000	170,0000	2734,900	3445,400	1.2700	1351,000	212,400
Std. Dev.	170,342	5569,776	248.4236	111.6976	0.9566	21652.05	357,443

Source: Appendix 3

Based on the table above, the number of observations in this research is 65 data which is a combination of five countries with a time span of 2010-2022 (13 years). From the results of descriptive statistical analysis, all observations can be explained as follows.

a. Variable volume of Indonesian natural rubber exports
   Variable Y has the highest value of 624.7 thousand tons and the lowest value of 69.8 thousand tons. The highest export volume of Indonesian natural rubber occurred in the United States in 2015 and the lowest export volume of natural rubber occurred in India in 2011. The mean and median volume of Indonesian natural rubber exports (Y) was 335.1 thousand tons and 330 thousand tons. The standard deviation value of Indonesia's natural rubber export volume (Y) is 170.3 thousand tons. The mean value of the Indonesian natural rubber export volume variable is greater than the standard deviation, so it can be concluded that the average of all data on the Indonesian natural rubber export volume variable is able to describe the variables of exchange rate, production quantity, land area, international prices, GDP per capita of the destination country, and good economic distance.
b. Exchange rate variable (X1)
   The variable Rp. 10,425. The standard deviation value of the exchange rate (X1) is IDR 5,569.8. The mean value of the exchange rate variable is greater than the standard deviation, so it can be concluded that the average of all data on the exchange rate variable is able to describe the exchange rate variable, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance well.
c. Production quantity variable (X2)
   Variable X2 has the highest value of 3,680.4 thousand tons and the lowest value of 2,734.9 thousand tons. The highest production amount occurred in 2017 and the lowest production amount occurred in 2010. The mean and median production quantities (X2) were 3,195.2 thousand tons and 3,145.4 thousand tons. The standard deviation value of production quantity (X2) is 248.4 thousand tons. The mean value of the production quantity variable is greater than the standard deviation, so it can be concluded that the average of all data on the production quantity variable is able to describe the exchange rate variable, production

quantity, land area, international prices, GDP per capita of the destination country, and economic distance well.

d. Land area variable (X3)

Variable X3 has the highest value of 3,826.2 thousand Ha and the lowest value of 3,445.4 thousand Ha. The highest land area occurred in 2022 and the lowest land area occurred in 2010. The mean and median land area values (X3) were 3,628.1 thousand Ha and 3,639 thousand Ha. The standard deviation value of land area (X3) is 111.7 thousand Ha. The mean value of the land area variable is greater than the standard deviation, so it can be concluded that the average of all data on the land area variable is able to describe the exchange rate variables, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance well.

e. International price variable (X4)

Variable X4 has the highest value of 4.75 USD/kg and the lowest value of 1.27 USD/kg. The highest international price occurred in 2010 and the lowest international price occurred in 2015. The mean and median international price (X4) was 2.27 USD/kg and 1.92 USD/kg. The standard deviation value of international prices (X4) is 0.96 USD/kg. The mean value of the international price variable is greater than the standard deviation, so it can be concluded that the average of all data on the international price variable is able to describe the exchange rate variables, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance well.

f. Variable GDP per capita of destination country (X5)

Variable X5 has the highest value of 76,330 USD and the lowest value of 1,351 USD. The highest GDP per capita occurred in the United States in 2022 and the lowest international price occurred in India in 2010. The mean and median GDP per capita (X5) values were 28,000.3 USD and 29,289 USD. The standard deviation value of GDP per capita (X5) is 21,652.1 USD. The mean value of the GDP per capita variable is greater than the standard deviation, so it can be concluded that the average of all data on the GDP per capita variable of the destination country is able to describe the exchange rate, quantity of production, land area, international prices, GDP per capita of the destination country, and economic distance variables well. .

g. Economic distance variable (X6)

Variable X6 has the highest value of 1,619.8 Km and the lowest value of 212.4 Km. The highest economic distance occurred in the United States in 2022 and the lowest economic distance occurred in China in 2010. The mean and median economic distance (X6) were 579.6 km and 435.7 km. The standard deviation value of economic distance (X6) is 357.4 Km. The mean value of the economic distance variable is greater than the standard deviation, so it can be concluded that the average of all data on the economic distance variable is able to describe the exchange rate variable, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance well.

Panel Data Regression Estimation Model Selection Test Results

The regression model used in this research is moderated regression analysis which uses an absolute difference test with panel data and is calculated using the EViews 12 program. Generally, before carrying out panel data regression, Chow, Hausman and Lagrange Multiplier tests are needed to determine the estimation model used. Table 7 shows the Chow test results with the help of EViews 12.

Table 7. Chow test

Effects Test	*Statistics*	*df*	*Prob.*
Cross-section F	26.246200	(4.54)	0.0000
Chi-square cross-section	70.188596	4	0.0000

Source: Appendix 3

The results of the Chow test show that the Chi-square probability value is 0.0000 <0.05, so the model chosen is the Fixed Effect Model as a panel data estimation model. After the Chow test produces a decision using the Fixed Effect Model, then proceed to determine the model estimation. The second stage in determining the estimated model is to see which estimate is the right one to use, whether the Random Effect Model or the Fixed Effect Model through the Hausman test.

Table 8. Hausman test

Test Summary	*Chi-Sq. Statistics*	*Chi-Sq. df*	*Prob.*
Random cross-section	0.612691	6	0.9616

Source: Appendix 3

Test results*Hausman*shows a probability value of 0.9616 > 0.05, so the appropriate estimate used in this research is the Random Effect Model. After the Hausman test produces a decision using the Random Effect Model, then proceed to determine the model estimation. The third stage in determining the estimated model is to see which estimate is the right one to use, whether the Common Effect Model or the Random Effect Model through the Lagrange Multiplier test. The following are the results of the Lagrange Multiplier test shown in Table 9.

Table 9. Lagrange Multiplier Test

	Cross-section	*Test Hypothesis Time*	*Both*
Breusch-Pagan	0.083048	2.633450	2.716498
	(0.7732)	(0.1046)	(0.0993)

Source: Appendix 3

Test results*Lagrange Multiplier*swhich has been carried out using the Breusch-Pagan method shows that the Breusch-Pagan cross-section probability value is 0.7732 > 0.05, so the appropriate estimate used in this research is the Common Effect Model.

Panel Data Regression Analysis

The relationship between the independent variable and the dependent variable is analyzed using panel data regression analysis. The results of the equations have been carried out after going through the Chow test, Hausman test, etctest*Lagrange Multipliers*shows that the best model in this research is the Common Effect Model with the following results.

Table 10. Common Effect Model Results

No.	*Variables*	*Coefficient*	*Std. Error*	*t-Statistics*	*Prob.*
1	C	1486,173	861.9164	1.725708	0.0897
2	X1	-0.047672	0.011607	-4.107280	0.0001
3	X2	0.181693	0.078836	2.304687	0.0248
4	X3	-0.185079	0.202130	-0.915640	0.3636
5	X4	-28.85290	28.04593	-1.028773	0.3079
6	X5	0.019814	0.004163	4.759638	0.0000
7	LOG X6	-190.8400	87.43694	-2.182601	0.0331
R-squared		0.633576	*F-statistic*		16.71443
Adjusted R-squared		0.595670	*Prob(F-statistic)*		0.000000

Source: Appendix 3

Based on the regression results above, it can be formulated as follows:

Y = 1486.173 – 0.0477X1 + 0.1817X2 – 0.1851X3 – 28.8529X4 + 0.0198X5 – 190.48logX6…… ……(4.1)

Where:

Y =Indonesian Natural Rubber Export Volume
α = constant
β = regression coefficient
X_1 =exchange rate
X_2 =production amount
X_3 = land area
X_4 = international price
X_5 = GDPper capitacountry of destination
X_6 = economic distance
i = destination country, where i = 5
t = year, where t = 2010-2022
μ = standard error

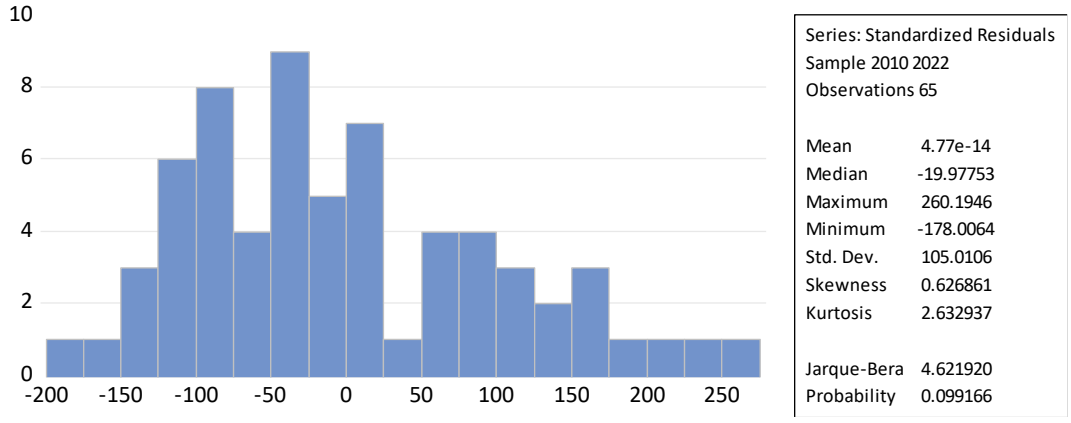
Table 10 shows that the exchange rateinfluentialnegative and significant on the volume of natural rubber exports to the five destination countries with a coefficient of -0.048 and a significance level of 0.000 <0.05.*Standardized Coefficient*The production quantity variable is 0.182 and the significance level is 0.025 <0.05, indicating that the production quantity has a

positive and significant effect on the volume of natural rubber exports to the five destination countries. The land area variable has a negative and insignificant effect on the volume of natural rubber exports to the five destination countries with a coefficient of -1.185 and a significance level of 0.364 > 0.05. The international price variable has a negative and insignificant effect on the volume of natural rubber exports to the five destination countries with a coefficient of -28.853 and a significance level of 0.308 > 0.05.*Standardized Coefficient*GDP variableper capitadestination country, namely 0.02 and a significance level of 0.000 < 0.05 indicates that GDPper capitadestination countries have a positive and significant effect on the volume of natural rubber exports to the five destination countries. The economic distance variable has a negative and significant effect on the volume of natural rubber exports to the five destination countries with a coefficient of -190.84 and a significance level of 0.033 <0.05. Based on Table 4.13, it shows that the coefficient of determination (R2) is 0.634, meaning that the variable volume of Indonesian natural rubber exports to the five destination countries is significantly influenced by the exchange rate variables, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance. amounting to 63.4 percent, while the remaining 36.6 percent was influenced by other factors not included in the model.

Classic Assumption Test Results

a. Normality test

BaseDecision making for the normality test is first, if the probability <0.05 then the data distribution is not normal. Second, if the probability is > 0.05 then the data distribution is normal. Third, if p-value <α(0.05), then Ho is rejected and H1 is accepted. In Figure 1, the statistical residual graph output shows that the probability value is 0.099166 > 0.05, thus explaining that the data meets the assumption of normality.



Source: Appendix 4

Figure 1. Normality Test Results

b. Heteroscedasticity Test

The heteroscedasticity test is carried out using the Glejser test with the condition that the probability value is > 0.05 so it is free from symptoms of heteroscedasticity, and vice versa if the probability value is < 0.05 then heteroscedasticity occurs, the results of the Glejser test are

shown in Table 11.The results of the tests carried out show that the probability value is 0.0936 which means that the significance value is > 0.05 so it can be concluded that the regression model is free from heteroscedasticity problems.

Table 11. Glejser Test Results

Heteroscedasticity Test: Glejser			
Null hypothesis: Homoskedasticity			
F-statistic	1.914964	*Prob. F*(6.58)	0.0936
*Obs*R-squared*	10.74742	*Prob. Chi-Square*(6)	0.0965
Scaled explained SS	8.101924	*Prob. Chi-Square*(6)	0.2307

Source: Appendix 4

c. Multicollinearity Test

The multicollinearity test needs to be carried out on regressions that use more than one independent variable, this aims to determine whether there is a mutual influence between the independent variables studied. The testing criteria carried out in this research are:

a) The coefficient value is <0.90, then there is no multicollinearity in the data.
b) The coefficient value is > 0.90, then the data has multicollinearity.

Table 12. Multicollinearity Test Results

	X1	X2	X3	X4	X5	logX6
X1	1.000000	0.101730	0.149495	-0.136243	0.817344	0.524689
X2	0.101730	1.000000	0.400669	-0.692397	0.034870	0.074027
X3	0.149495	0.400669	1.000000	-0.746776	0.093398	0.193439
X4	-0.136243	-0.692497	-0.746776	1.000000	-0.059135	-0.130832
X5	0.817344	0.034870	0.093398	-0.059135	1.000000	0.783471
logX6	0.524689	0.074027	0.193439	-0.130832	0.783471	1.000000

Source: Appendix 4

The correlation coefficient value X1 and X2 is 0.10173 < 0.90, X1 and 90, X1 and logX6 are 0.524689 < 0.90, X2 and X3 are 0.400669 < 0.90, , X2 and logX6 are 0.074027 < 0.90, X3 and X4 are -0.746776 < 0.90, X4 and X5 are -0.059135 < 0.90, X4 and logX6 are -0.130832 < 0.90, So the results of the tests carried out show that the correlation coefficient value between the independent variables has a value of <0.90, so that the regression model used does not have multicollinearity problems.

Hypothesis Test Results

Hypothesis testing can be done by proving the regression coefficient. Proof of the regression coefficient was carried out to test the influence of the independent variable (X), namely exchange rate, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance. This test was carried out jointly using the F test and using the t test on the dependent variable (Y), namely the volume of natural rubber exports to the five destination countries. Then it can be seen whether the independent variables really have an influence on the dependent variables in this research. The following is the hypothesis testing that will be carried out.

a. Simultaneous Regression Coefficient Significance Test (F Test)

The F test was carried out to determine the feasibility of the multiple linear regression model which was carried out as an analytical tool that tests the influence of the independent variable on the dependent influence. The F test in this study aims to test the significance between the influence of the exchange rate, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance on the volume of Indonesian natural rubber exports to the five destination countries. The steps are as follows.

Table 13. F Test Results

R-squared	0.633576	*F-statistic*	16.71443
Adjusted R-squared	0.595670	*Prob(F-statistic)*	0.000000

Source: Appendix 3

Based on Table 13, because Fcount (16.71443) > Ftable (0.99945) with a probability of 0.000000 < 0.05, then H0 is rejected and H1 is accepted. This means that the variables exchange rate (X1), production quantity (X2), land area (X3), international prices (X4), GDP per capita of destination country (X5), and economic distance (X6) simultaneously have a significant and significant effect on the volume of rubber exports. nature of Indonesia to five destination countries (Y).

b. Partial Regression Coefficient Significance Test (t Test)

The t test is used to test the significance of the relationship between the independent variables (XI, The test was carried out by comparing the calculated t with the t table to be able to determine the partial influence of each independent variable on the dependent variable in this research. The t test in this research is as follows.

Table 14. t test results

No	*Variables*	*Coefficient*	*Std. Error*	*t-Statistics*	*Prob.*
1	C	1486,173	861.9164	1.725708	0.0897
2	X1	-0.047672	0.011607	-	0.0001

				4.107280	
3	X2	0.181693	0.078836	2.304687	0.0248
4	X3	-0.185079	0.202130	-	0.3636
				0.915640	
5	X4	-28.85290	28.04593	-1.028773	0.3079
6	X5	0.019814	0.004163	4.759638	0.0000
7	X6	-190.8400	87.43694	-2.182601	0.0331

Source: Appendix 3

1) The influence of the exchange rate on the volume of Indonesian natural rubber exports to five destination countries

   The t test on the exchange rate variable shows a value of -4.107280 < 1.672 and the probability value obtained is 0.0001 < 0.05, so the exchange rate has a negative and significant effect on Indonesian natural rubber exports to the five destination countries.
2) The influence of production volume on the volume of Indonesian natural rubber exports to the five destination countries

   The t test on the production quantity variable shows a value of 2.304687 < 1.672 and the probability value obtained is 0.0248 < 0.05, so the production quantity has a positive and significant effect on Indonesian natural rubber exports to the five destination countries.
3) The influence of land area on the volume of Indonesian natural rubber exports to five destination countries

   The t test on the land area variable shows a value of -0.915640 < 1.672 and the probability value obtained is 0.3636 > 0.05, so land area does not have a significant effect on Indonesian natural rubber exports to the five destination countries.
4) The influence of international prices on the volume of Indonesian natural rubber exports to five destination countries

   The t test on the international price variable shows a value of -0.028773 < 1.672 and the probability value obtained is 0.3079 > 0.05, so international prices do not have a significant effect on Indonesian natural rubber exports to the five destination countries.
5) The influence of GDP per capita of the destination country on the volume of Indonesian natural rubber exports to the five destination countries

   The t test on the GDP per capita variable of the destination country shows a value of 4.759638 > 1.672 and the probability value obtained is 0.000 < 0.05, so GDP per capita of the destination country has a positive and significant effect on Indonesian natural rubber exports to the five destination countries.
6) The influence of economic distance on the volume of Indonesian natural rubber exports to the five destination countries

   The t test on the economic distance variable shows a value of -2.182601 < 1.672 and the probability value obtained is 0.0331 < 0.05, so economic distance has a negative and significant effect on Indonesian natural rubber exports to the five destination countries.

Discussion of Research Results

The Effect of the Exchange Rate on the Volume of Indonesian Natural Rubber Exports to Five Destination Countries

The results of previous hypothesis testing showed that the coefficient value was negative at -0.047672 with a significance level of 0.0001, which was smaller than the significance level determined at 0.05. If the rupiah exchange rate falls by 1 rupiah, the volume of Indonesian natural rubber exports will decrease by 0.047672 rupiah. The test results show that the exchange rate variable has a negative and significant effect on Indonesia's natural rubber exports to five destination countries. This is not in accordance with the theory discussed previously, an increase in the foreign exchange rate (for example due to appreciation), will have a tendency to create exports (Denburg, 1994:34). Exchange rates have an influence on the continuity of international trade between countries. If the rupiah exchange rate weakens, there will be inequality in export goods and also companies that are oriented towards raw materials imported from abroad, where export goods are more competitive but on the other hand costs will be higher if Indonesian producers use more raw materials. imports originating from abroad. If the US dollar exchange rate depreciates, the value of the domestic currency weakens and this means that the value of the foreign currency strengthens in its exchange rate (price) which will cause exports to increase and imports to tend to decrease (Sukirno, 2012: 319).

This is in line with research by Gowinda and Ayuningsasi (2021), which states that the US dollar exchange rate has a negative and significant influence on the value of Indonesian crude oil exports. This is because when the rupiah exchange rate against the US Dollar strengthens, the volume of Indonesian crude oil exports decreases as a result of the high price of crude oil commodities for importers, and conversely when the rupiah exchange rate against the US Dollar weakens, the volume of Indonesian crude oil exports increases as an effect. cheap crude oil commodity prices for importers. This shows the importance of exchange rate policy to trigger an increase in Indonesia's crude oil exports.

This is because Indonesian rubber does not require raw materials so it does not require materials to be imported for production, so that when the rupiah exchange rate weakens it does not affect rubber exports. This is supported by research by Ginting (2013) and Alvaro (2019), stating that exchange rates in the long term and short term have a negative influence on exports, so that a decrease in the Indonesian currency exchange rate against other countries will result in increased exports. When the exchange rate decreases, other countries will see the price of goods in Indonesia as cheaper, thereby increasing demand for Indonesian goods.

The Influence of Production Amounts on the Volume of Indonesian Natural Rubber Exports to Five Destination Countries

The results of previous hypothesis testing showed that the coefficient value was positive at 0.181693 with a significance level of 0.0248 which was smaller than the significance level determined at 0.05. If the amount of production increases by 1 thousand tons, the export volume of Indonesian natural rubber will increase by 0.181693 thousand tons. The test results show that the production quantity variable has a positive and significant effect on Indonesia's natural rubber exports to the five destination countries. When the amount of natural rubber

production increases, the volume of Indonesian natural rubber exports will also increase and vice versa. An increase in production will also be able to meet the needs of many countries in terms of producing tires, one of which is tires, however, exporting countries must also maintain domestic rubber reserves for domestic needs as well. This is supported by research (Dewi and Indrajaya, 2020) which states that the amount of production has a positive effect on Indonesian paper exports.

This is in line with research by Gowinda and Ayuningsasi (2021), which states that production has a positive and significant effect on the value of Indonesian crude oil exports. When Indonesian crude oil production increases, the volume of Indonesian crude oil exports will increase because supply increases and vice versa. Apart from that, increasing production will be able to meet domestic needs and part of this production can be exported.

Based on research conducted by Yulianti and Rozani (2021), it is stated that the amount of rubber production has a positive and significant effect on the volume of Indonesian rubber exports. This shows that the greater the amount of rubber produced, the greater or greater the volume of Indonesian rubber exports will be. Increasing domestic natural rubber production will directly increase the volume of Indonesian rubber exports. This is in accordance with the theory of absolute advantage by Adam Smith which says that the greater the production, the greater the volume of exports. This research is also supported by Airlangga (2007:86) who says that if production increases, export volume will also increase.

This is in accordance with research by Galih and Setiawan (2012), which states that production capacity has a significant positive effect on export performance. If domestic production increases, export volume will also increase. High foreign demand for a commodity or production output for export will trigger an increase in production activities to meet foreign market demand.

The Influence of Land Area on the Volume of Indonesian Natural Rubber Exports to Five Destination Countries

The results of previous hypothesis testing showed that the coefficient value was negative at -0.185079 with a significance level of 0.3636 which was greater than the significance level determined at 0.05. If the land area decreases by 1 thousand ha, the volume of Indonesian natural rubber exports will decrease by 0.185079 thousand ha. These results show that the land area variable does not have a significant effect on Indonesia's natural rubber exports to the five destination countries. This is not in accordance with previous theory, when the area of natural rubber land increases, the volume of Indonesian natural rubber exports will also increase and vice versa. An increase in land area will also increase the amount of rubber production. Increasing land area can produce more production so that the number of exports will increase (Safitri et al. 2023).

This research is in line with research conducted by Wardani and Mulatsih (2017) which states that land area has a negative effect on natural rubber exports in Indonesia. This is because large areas of land are not yet applicable in terms of expanding product value in Indonesia. This is due to low efficiency and damaged old land. This shows that the large area of land is not balanced by applying fertilizer to the land, eradicating pests or viruses that can

damage the land, erratic weather and excessive rainfall resulting in the soil structure being damaged as a result of which the plants become less productive. This research is supported by Ibnu et al. (2022) which states that land area has a negative effect on natural rubber exports. This is due to the large area of damaged land and the ineffective condition of the land which looks like a forest, so that the land requires development efforts.

The Influence of International Prices on the Volume of Indonesian Natural Rubber Exports to Five Destination Countries

The results of previous hypothesis testing showed that the coefficient value was negative at -28.85290 with a significance level of 0.3079 which was greater than the significance level determined at 0.05. If international prices decrease by 1 USD/kg, the volume of Indonesian natural rubber exports will decrease by 28.85290 USD/kg. These results indicate that the international price variable does not have a significant effect on Indonesia's natural rubber exports to the five destination countries. This is not in accordance with the theory discussed previously, theoretically international prices have a positive or significant relationship with exports. Increasing prices can encourage more investment which can ultimately increase production and exports (Lubis and Rahmani, 2023).

This research is in line with research conducted by Rismiyati, et al (2021) and Wirawan and Indrajaya (2012) which stated that prices do not have a significant effect on the volume of Indonesian exports. This is due to price competition on the world market which is increasingly competitive and also the unstable economic conditions caused by the global crisis so that importing countries are reluctant to buy. The research results are similar to research conducted by Sani and Purbadharmaja (2022) which concluded that international prices have a negative relationship with exports. If there is an increase in international prices, this will affect demand for products from the destination country because the high prices set by the exporting country will have an impact on low demand and a decrease in the purchasing power of the destination country.

The influence of GDP per capita of destination countries on the volume of Indonesian natural rubber exports to five destination countries

The results of previous hypothesis testing show that the coefficient value is positive at 0.019814 with a significance level of 0.0000 which is smaller than the significance level determined at 0.05. If the GDP per capita of the destination country increases by 1 USD/billion, the volume of Indonesian natural rubber exports will increase by 0.019814 USD/billion. These results show that the GDP per capita variable of the destination country has a positive and significant effect on Indonesian natural rubber exports to the five destination countries. When the GDP per capita of the destination country is high, the level of consumption rises, then the export supply increases which results in the volume of exports to the export destination country increasing (Priyono and Widyawati, 2019).

The results of this research are in line with research conducted by Herniati and Indrajaya (2021) which states that GDP per capita of the destination country has a positive and significant effect on Indonesian pearl exports. This research is supported by Siburian (2019) who states that GDP per capita of the destination country has a positive and significant effect on Indonesia's

natural rubber exports. This happens because GDP measures two things at the same time, namely the total income of everyone in the economy and the total expenditure of the country to purchase goods and services produced by the economy. When a country's economic growth is increasing, that country's ability to import will increase and conversely, when a country's economic growth is falling, that country's ability to import will decrease. This explains that every increase in GDP per capita of the export destination country will increase the volume of Indonesian exports.

The Effect of Economic Distance on the Volume of Indonesian Natural Rubber Exports to Five Destination Countries

The results of previous hypothesis testing showed that the coefficient value was negative at -190.8400 with a significance level of 0.0331 which was smaller than the significance level determined at 0.05. If economic distance decreases by 1 km, Indonesia's natural rubber export volume will decrease by 190,8400 km. These results show that the economic distance variable has a negative and significant effect on Indonesia's natural rubber exports to the five destination countries. This is in accordance with research by Li et al., (2008), Sarwoko (2009), Sitorus (2009), Dilanchiev (2012), and Pradipta and Firdaus (2014), concluding that economic distance has a significant negative effect on trade. According to the gravity model, the assumption is that distance has a negative effect because when the distance between the exporter and importer is large, exports will be more expensive due to higher transportation costs and logistics services (Wahyudi and Anggita, 2015).

The results of this research are in line with research by Eprillia and Aisyah (2023) which states that economic distance has a negative influence on exports, this occurs because of the development of economic distance which is calculated from the distance of the capital of each destination country to the GDP per capita of the destination country with the total GDP per capita of the country The aim is to illustrate that the greater the GDP per capita of a country, the greater the economic distance which causes international trade to also increase. The economic distance between each country is one of the factors that influences the volume of exports because it is in accordance with international trade mechanisms, where long distances greatly influence transportation costs, so that the greater the distance between two countries, the greater the costs that must be incurred by the exporting destination country and vice versa.

The results of this research are supported by research conducted by Lembang and Pratomo (2013) which states that economic distance has a negative effect on export volume. The further the distance between the exporting and importing countries, the smaller the volume and value of trade. This is caused by the increasingly expensive costs that must be incurred to carry out these transactions.

CONCLUSION

Based on the results of the analysis that has been described, conclusions can be drawn as answers to the problem formulation, namely as follows:

1) Simultaneously, the exchange rate, production quantity, land area, international prices, GDP per capita of the destination country, and economic distance have a significant effect on Indonesia's natural rubber exports to the five destination countries.
2) Partially, the exchange rate has a negative and significant effect on Indonesian natural rubber in the five destination countries. The amount of production has a positive and significant effect on Indonesian natural rubber in the five destination countries. Land area does not have a significant effect on Indonesian natural rubber in the five destination countries. International prices do not have a significant effect on Indonesian natural rubber in the five destination countries. GDP per capita of the destination country has a positive and significant effect on Indonesian natural rubber in the five destination countries. Economic distance has a negative and significant effect on Indonesian natural rubber to the five destination countries.

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