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Competitiveness and Exports Sustainability of The Indonesian Natural Rubber

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Abstract: This paper examines Indonesian natural rubber commodities export competitiveness by employing set of revealed comparative advantage (RCA) and export competitive index (ECI) with respect to global trade. The market structure that is formed on natural rubber commodities is calculated using Herfindahl Index and Concentration Ratio analysis tools shows the oligopoly-shaped market structure. Calculation of comparative advantage with RCA analysis shows that the four countries exporting natural rubber, namely Thailand, Indonesia, Malaysia and Vietnam each have a comparative advantage. Where Indonesia has a better comparative advantage than Thailand in the period 2011 to 2015. This result is different from the calculations made on competitive advantage (ECI) in which Indonesia's natural rubber commodities are not more competitive than Thailand.

Keywords: natural rubber; revealed comparative advantage; global trade; market structure; export competitive index

Introduction

For the national economy, rubber is a very important plantation commodity. Aside from being a source of employment, this commodity also contributes significantly as a source of non-oil and gas foreign exchange, suppliers of rubber raw materials and an important role in encouraging the growth of new economic centers in rubber development areas. Rubber together with oil palm are the two major commodities producing the largest foreign exchange earnings from the estate subsector. in the last 5 years, rubber contributes foreign exchange from 25% to 40% of total exports of plantation products (Gapkindo, 2016). Aside from being a producer of export revenues, rubber plantations are mostly smallholder estates with a relatively small average ownership, but are a source of income for millions of rubber farming families. In 2014, the total area of smallholder estates reaches no less than 85%, the rest is state and private plantations. Of the total production, almost 76% of it comes from smallholder plantation (BPS, 2015).

One of the commodities that have been the mainstay of exports are natural rubber and processed goods from rubber. Exports of natural rubber have a significant development since the automotive world is experiencing growth, especially in terms of vulcanizing rubber tires. This makes the world demand for natural rubber continues to grow every year. This condition benefits Indonesia because Indonesia has a very suitable climate for rubber crops. Rubber plants can produce throughout the year in Indonesia and almost all regions in Indonesia are suitable for rubber planting. This is what makes Indonesia as one of the rubber producing countries in the world. Meanwhile, the increase in consumption of natural rubber, especially in Asian countries due to the increasing development of tire industry and other industrial components. The consumption of natural rubber and synthetic rubber in the year 2004 reached 20.03 million tons will increase to reach 28.67 million tons in 2020, including 11.9 million tons of natural rubber. Indonesia is expected to supply 3.5 million tons by 2020.

The ISRG (International Rubber Study Group) is of the opinion that in the long run there is an estimated supply shortage that is not only caused by rapidly increasing world demand but also two of the 3 natural rubber producing countries of Malaysia and Thailand, which are fast-growing economies, may be a new generation of Newly Industrialized Countries (NICs), so both countries will leave rubber agribusiness. Indonesia is expected to fill the supply shortage for world needs.

Table 1**. Land Area and Total Rubber Production Indonesia**

No	Year	Land Area (000 Ha)	Production (000 ton)
1	2010	2,948.70	2,193.40
2	2011	2,931.80	2,359.80
3	2012	2,987.00	2,429.50
4	2013	3,026.02	2,655.90
5	2014	3,062.93	2,555.40

Source: www.bps.go.id, 2014

In contrast to the relatively low growth of the area, the growth of national rubber production during the period of 1970-2015 is relatively high at around 3.89% per year. This is due to an increase in the area of smallholder rubber plantations using superior clones whose productivity is quite high. This is supported by data showing the highest production growth occurs in smallholder plantations (4.33% per year), while the growth of private and state-owned plantations is only about 3.88% and 1.77% per year (BPS, 2014). Indonesia is a country with the largest area of rubber plantation in the world (Food and Agriculture Organization, 2015). Nevertheless, pit does not make Indonesia as the biggest rubber exporter country. Indonesia occupies the second position of production and export of natural rubber after Thailand (United Nation Comtrade, 2017). The importance of natural rubber commodities causing the need for proper handling in the development of export competitiveness so that these commodities can then serve as one the backbone of the national economy.

Such large quantities of production are then confronted with market penetration conditions in which Indonesia must compete with other producer countries, as well as price fluctuations. The price of natural rubber in international trade tends to fluctuate

(International Rubber Concortium Limited, 2017). This is one of the sustainable traits. Such price fluctuations affect the natural rubber trade flows and the development efforts of Indonesia's natural rubber exports in order to increase the country's foreign exchange which has consequences on changes in the economic environment or trade policies that significantly affect the distribution of income. In the era of free trade, the development of rubber commodities facing various challenges. The more open the market leads competition (competition) that occurs to export natural rubber commodities become increasingly tight. Open market conditions lead to increasingly minimal the power of market control so that nothing can hinder the entry of new competitors in the trade. As an illustration, the growth of natural rubber exports by the country of Vietnam is increasingly affecting the amount of global natural rubber supply. Increasing the number of these offers will ultimately affect the formation of prices (United Nation Comtrade, 2017).

On the basis of the analysis on the development of natural rubber exports becomes very important as the initial information to explain the power condition competitiveness of Indonesia's natural rubber commodities in export markets. To know the position Indonesia's natural rubber competitiveness, it is also necessary to know the development of commodities in other countries that become competitors in the international market. This information is useful to see how much market control by natural rubber exporters in a global scope that will ultimately determine market conditions formed from such market share. By knowing the condition of the market structure that is formed on natural rubber commodity, the policy to be applied to the commodity will be formulated properly in order to develop competitiveness of export of commodity related in international market.

Literature Review

Competitiveness in two perspectives defines by The OECD (2012): (i) Competitiveness as the ability to be successful when facing competition (ii) Competitiveness as the ability to sell products that meet demand requirements and at the same time, ensure profits over time that enable the firm to thrive. Comparative advantage of a nation refers to the ability to produce a commodity with a lower opportunity cost of other products forgone than another nation, while competitive advantage indicates whether a firm could successfully compete in the trade of the commodity in the international market, given existing policies and economic structure (Warr, 1994) as cited by Mosoma (2004).

Trade theory suggests that a nation‟s competitiveness is based on the concept of comparative advantage. This theory Conceptualised by Ricardo and by the Heckscher-Ohlin model (in a two-country, two-input case), comparative advantage postulates that trade flows are the result of differences in production costs among countries and that a country will specialise in the production of a good in which it has a cost advantage (Latruffe, 2010). According to Krugman (1994) the theory of competitiveness is based on comparative and competitive advantage, that concept is related, but one is often mistaken for the other. The concept of comparative advantage is derived from traditional theory of international trade that it is more profitable for a country to export goods that it produces at a relatively lower cost than other countries, and import goods that it produces at a relatively higher cost than other countries. Such a concept is useful when comparing countries, that is to say when measuring international competitiveness.

Methods

The type of data used in this study is secondary data obtained from several sources such as the Ministry of Commerce, the Department Agriculture, BPS, Gapkindo, ITS (International Trade Statistics), FAO statistics, IRSG (International Rubber Study Group), WEF (World Economic Forum), Comtrade, APPI (Association of Indonesian Plantation Research), as well as other information from the internet and other books. The analysis used is quantitative descriptive analysis refers to the theoretical framework of analysis of competitive advantage and comparative advantage that attempts to explain the existence of the plantation sector, in particular natural rubber in international trade. The data obtained were analyzed by using descriptive method. The goal is to create a picture in a systematic, factual, and accurate manner concerning facts, traits as well the relationship between the phenomena being investigated.

Herfindahl Index (HI) and Concentration Ratio (CR) are analytical tools which is used to determine the market structure facing an industry. HI is a tool that measures the size of the inside companies an industry and as an indicator of the amount of competition between them. HI and CR is often used to measure industrial concentration. HI value reflecting the value of market share control by an enterprise in a industry. The first step to do to analyze market share by using Herfindahl Index is by calculating market share each country producing natural rubber in the international market. Calculation of market share performed using the following formula (Giurgiu, 2009):

$$S_{ij} = \frac{X_{ij}}{TX_j}$$

Where S_{ij} denotes the country's natural rubber market share in the international market; X_{ij} is the value of the country's natural rubber export in the international market; and TX_j represents total value of natural rubber export in international market. Herfindahl Index analysis tool in this study is used for the purpose to know the market structure of natural rubber commodities in the international market while measuring the market share of each country involved trade of such natural rubber. The market share of a natural rubber trade the country is calculated by comparing the country's natural rubber exports with the world's total natural rubber exports. The same formula is then used to measure the market structure and market share of a country in trade International natural rubber as follows (Latruffe, 2010):

$$HI = S_1^2 + S_2^2 + S_3^2 + \cdots .. + + S_n^2$$

Where HI denotes to Herfindahl Index; S_i is the market share of the country's sales in the world trades of natural rubber and n represents number of countries involved in natural rubber trade of the world. This index is worth between more than zero to one. If the HI approaches zero, it means that the relevant industrial structure tends to market competition (competitive market), while if the index is worth close to one then the structure the industry tends to be monopolistic. Herfindahl index too reflecting the degree of market dominance in an industry from year to year. If this index increases from year to year means that industrial market concerned tend to oligopoly structure, or even monopoly. If on the contrary, means the market structure leads to perfect competition.

CR-4 (Concentration Ratio of the 4 Largest Companies) is a coefficients that explain the percentage of market share by four domains the largest company in an industry. The smaller CR-4 coefficients reflecting a perfectly competitive structure. Based on analysis of standards in the industrial economy, that the industrial structure is said to be oligopoly-shaped when the four largest producers control a minimum of 40% share market sales of the industry concerned (CR4 = 40%) (Giurgiu, 2009). The concentration ratio is formulated as follows (Giurgiu, 2009):

$$CR_{ni} = \sum_{j=1}^{n} Si_{ij}$$

Where S_{ij} is the market share of natural rubber industry in country j; CR_{ni} is n-ratio of concentration to natural rubber industries. The market structure can also be classified according to its concentration ratio (CR), namely:
1) The perfect competition of the market is shown with a very low concentration ratio.
2) Monopolistic competition (Monopolistic competition) market structure is indicated by the value of concentration ratio for four largest producers (CR4) below 40%.
3) The oligopoly market structure is indicated by the value of concentration ratio for the four largest producers (CR4) above 40%.
4) The monopoly market structure is indicated by the value of concentration ratio for the four largest producers (CR4) approaching 100%.

Most popular measuring competitiveness based on the concept of comparative advantageis is RCA index. That index was first formulated by Balassa (1965) and modified by Vollrath (1991) in order prevent to misunderstanding double counting between pairs of countries (Latruffe, 2010). The other name of RCA is called the Balassa index, and the relative export advantage (RXA) measure is call for Vollrath"s modified version, as it is based on exports. The ratio of a country export share of a commodity in the international market to the country"s export share of all other commodities calculating by this Formula. For the i-th country and j-th commodity, the RCA is defined as follows:

$$RCA_{ij} = RXA_{ij} = (X_{ij}/X_{ik}) / (X_{nj}/X_{nk})$$

where X are exports; k be a mark of all commodities other than j; n disignated all countries other than i. The country has a comparative advantage in the commodity under consideration indicates by RCA index greater than 1, because of that country has a strong export sector. Higher competitiveness revealed by it.

The Export Competitiveness Index (ECI) shows the ratio of export share a country in the world market for a particular commodity in a given period (t) with the ratio of a country's export share in the world market for that commodity in the previous period (t-1) (Hakobyan, 2017). Saboniene (2009) uses this export competitiveness index to estimate success or failure in an industry in order to increase growth in the face of increased market growth. With taking into account the share of a country's market, then this competitiveness index will become a better indicator in seeing the superiority of a commodity. ECI can be formulated as follows (Saboniene, 2009).

$$ECI_{KI} = \frac{X_{ki}/X_{w_t}}{X_{ki}/X_{w_{t-1}}}$$

Where X_{ki} is Export value of natural rubber commodity by country i; X_w are the value of world exports of natural rubber commodities; t represents on going period and t-1 represents previous period. ECI values show the competitiveness trends faced by a country against another country for a particular commodity. In other words, this value indicates whether a product in question has the ability to compete with other countries that are the country of its competitors. If value ECI of a commodity is greater than one, meaning the commodity is facing the increasing trend of competitiveness. Conversely, if the value of ECI is smaller than one, then the commodity faces the possibility of a decrease in market share or weakening competitiveness.

Findings

Development of Indonesia Natural Rubber Exports

Demand for natural rubber from year to year increasingly experienced enhancement. This can be seen from the increase of total export value of natural rubber in the world. The increase indicates an increase against demand due to developments in the industrial world globally. Table presents the value of world natural rubber exports in the period 2006-2015

Table 2. **Export volume of four Natural Rubber Producing Countries**

| Year	INDONESIA		THAILAND		MALAYSIA		VIETNAM		WORLD	
	Value (000 US $)	*VOL (Ton)*	*Value (000 US $)*	*VOL (Ton)*	*Value (000 US $)*	*VOL (Ton)*	*Value (000 US $)*	*VOL (Ton)*	*Value (000 US $)*	*VOL (Ton)*
2006	4,322,294	2,287,053	5,430,350	3,056,972	2,246,584	1,132,408	1,137,205	628,464	14,822,168	8,026,665
2007	4,870,513	2,407,848	5,640,503	2,966,128	2,135,471	1,018,107	1,312,360	673,743	16,039,045	8,027,694
2008	6,058,244	2,296,476	6,720,964	2,832,071	2,431,235	915,563	1,562,712	641,673	19,504,876	7,868,948
2009	3,243,980	1,992,001	4,308,003	2,740,089	1,267,076	703,080	1,108,678	630,263	11,624,552	7,306,229
2010	7,329,060	2,352,776	7,896,026	2,733,607	2,863,578	900,922	2,089,857	672,181	24,325,083	7,847,007
2011	11,766,242	2,557,093	13,176,350	2,997,018	4,339,680	946,085	2,989,218	713,520	45,425,509	8,549,604
2012	7,864,528	2,445,667	8,745,795	2,998,897	2,545,684	771,195	2,496,211	853,772	35,684,504	8,272,850
2013	6,910,663	2,703,287	8,233,510	3,437,042	2,228,361	847,462	2,378,698	990,186	25,408,790	9,238,933
2014	4,744,753	2,624,416	6,021,541	3,409,364	1,398,026	721,746	1,668,847	982,223	16,558,233	9,129,895
2015	3,701,478	2,631,139	4,976,693	3,653,497	1,034,131	706,493	1,065,834	783,416	12,866,360	9,181,573

Source : UN Comtrade (2017)

Based on Table 2, it can be seen that the increase of world natural rubber demand, recorded world rubber export volume in 2006 amounted to 8,026,665 tons increased to 9,181,573 tons in 2015. The increase happened 14,39% during last 10 years. The increase in world demand for rubber has boosted the export volume of natural rubber in some major exporting countries. Where Vietnam is the country that experienced the greatest increase of 24.66% during the last 10 years while Indonesia increased by 15.04% and Thailand by 19.51%. in contrast to Malaysia which actually decreased exports by 37.61%. The decline is due to the decreasing of Malaysian rubber tapping area due to land conversion from 750,000 hectares in 2008 to 590 thousand hectares in 2009 (Association of Natural Rubber Producing Countries, 2010). The volume of Indonesian natural rubber exports experienced significant decline occurred in 2008 and 2009. Where in 2007 export volume reached 2.4 million tons fell to 2.2 million tons in 2008 and 1.9 million tons in 2009. This was not only by Indonesia but also the three major exporting countries of natural rubber. The decline in natural rubber exports occurring in 2008 and 2009 was due to the global crisis experienced by most export destination countries of natural rubber.

Another interesting phenomenon in world natural rubber trade is that an increase in export volume is not always directly proportional to the increase in export value. This can be seen from the value of Indonesian rubber exports in 2013-2015 with export volume reaching 2.7 million tons of export value only reached 6.9 billion US Dollar. While in 2011 with export volume of only 2.5 million tons of export value obtained Indonesia reached 11.7 billion US Dollar. The main cause of the occurrence is the fluctuation of natural rubber prices in the international market is very dynamic, following the price of natural rubber in four major exporting countries.

Figure 1. **Natural Rubber Price of Four Main Exporting Countries (US$/ton)**
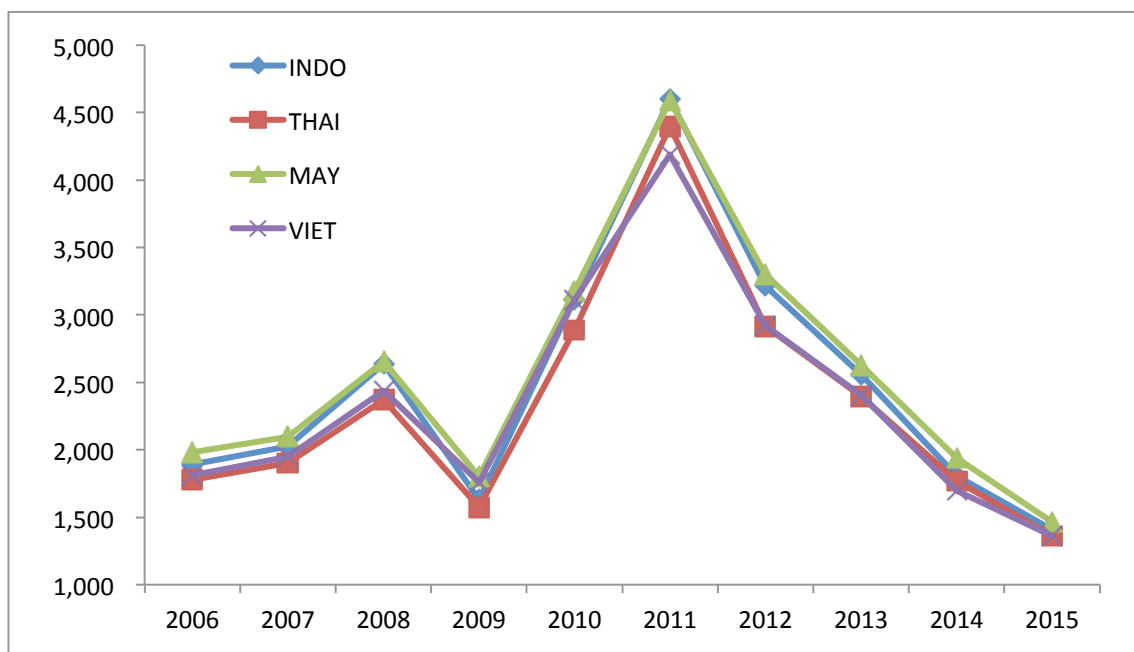
Source: UN Comtrade (2017)

The price of natural rubber in the four major exporting countries has the same trend with prices that are also relatively similar. In 2006-2008 there was an increase in price from 1.890 US Dollar / ton increase to 2,638 US Dollar / ton. Then it declined after the global economic crisis of 2008-2009, rising significantly from 1.629 US Dollar / ton in 2009 to 4,601 US Dollar / ton in 2011, but after that there was a sharp decline until 2015 only reach 1,407 US Dollar / ton. Natural rubber is a plantation product that is very vulnerable to price changes. Fluctuations that occur can be caused by various things, either internal and external factors. Price sensitivity is encouraging each countries to continue to reconstruct their respective products so it can continue to survive and still have a strong enough competitiveness in international markets.

Such developments then encourage countries rubber exporters make an effort to stabilize rubber prices. Effort is realized by the formation of a natural rubber joint venture company named "International Rubber Consortium Limited (IRCo)" in 2002. The establishment of this institution is slowly proven to improve rubber export prices nature in the international market. Increase in export value of natural rubber Malaysia is also due to the increasing price of natural rubber world. Unfortunately, the increase in world rubber prices did not last long. Crisis the global that hit in the 3rd quarter of 2008 caused the weakening the automotive industry that resulted in decreasing demand for rubber natural. This has an impact on the fall of the price of natural rubber in the market world (Arifin, 2013).

Facing the problem, ITRC (International Tripartite Rubber Council) which is an association of three rubber exporting countries nature of the world stipulates the reduction of export volume of natural rubber with the purpose of maintaining the price of natural rubber. The reduction is not without cause, given the global crisis caused the fall in demand for natural rubber world up to 1 million tons. Agreement on total export reduction of natural rubber of the three countries in 2009 reached 915 thousand tons, respectively set of 700 thousand tons through a three-state agreement scheme (Agree Export Tonnage Scheme = AETS) and 215 thousand tons of rubber tree rejuvenation in three the country. Decrease made in the first quarter of 2009 alone a total of 270 thousand tons, with a division of 132 thousand tons for Thailand, 116 thousand tons for Indonesia, and 22 thousand tons for Malaysia.

The significant decrease in rubber prices occurred in 2011-2015 due to declining world oil prices. Where in December 2011 world oil prices reached 104.26 US Dollars / Barrel fell to 36.56 US Dollars in December 2015. The decline in world oil prices will have implications for the increased production of synthetic rubber which is the goods of natural rubber substirusi. This is because petroleum is the main raw material of synthetic rubber production. Increased production of synthetic rubber can be seen from the increase in exports of South Korea's main producing countries, which in 2011 export volume of 1.2 million tons increased to 1.6 million tons in 2015 means that there is an increase in exports of 33.4%.

Structure of Natural Rubber Market in International Market

Natural rubber commodities are generally controlled by four major exporters, namely Thailand, Indonesia, Malaysia and Vietnam. This can be seen from the market share value controlled by each of those countries, where the control of the four has the greatest controlling value compared to other countries in international trade. In the period 2006-

2015, the average market share by Thailand, Indonesia, Malaysia and Vietnam were 37.54%, 29.63%, 10.31% and 8.20%. This means that approximately 85.68% of the international natural rubber market is controlled by the four countries.

Figure 2**. Export Market Share of the Four Countries of Natural Rubber Exporters**
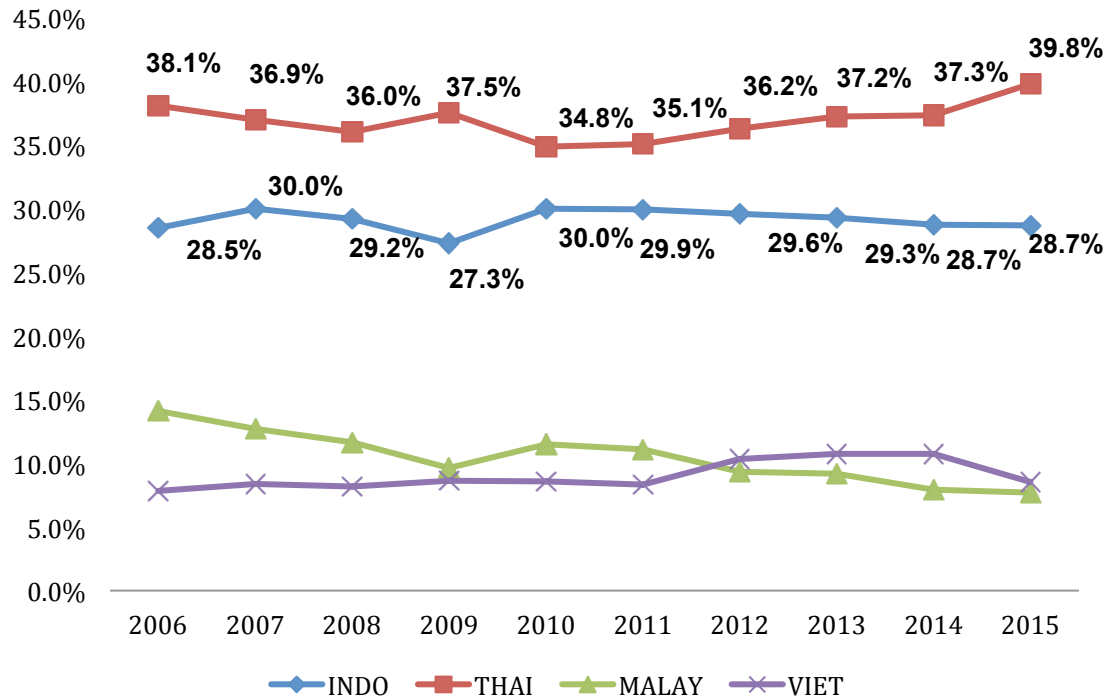
Source: UN Comtrade (2017)

Based on the calculations performed on the market domination of the exporting country, it can be seen the development trend in natural rubber market of the main exporter country as shown in Figure 2. The picture shows the amount of change of domination of the main exporter of natural rubber from year to year. The value obtained is the percentage of market share and market growth of each exporting country. Thailand is the country with the largest market share followed by Indonesia, Malaysia and Vietnam. But in the period 2012 to 2015 Vietnam is able to surpass Malaysia. On the other hand, Indonesia's market share trend tends to decline for the period of 2010-2015, as opposed to Thailand which has an increasing trend of export market share in the same period. Analysis of natural rubber market structure in the international market is analyzed quantitatively by looking at the mastery of the market share of each manufacturer natural rubber. Analyzer used is Herfindahl Index and Concentration Ratio. The calculation result of mastery of natural rubber market share from 2006 to 2015 by four major exporting countries of natural rubber world shown in Table 3.

**Table 3. Calculation results of Herfindahl Index and Concentration Ratio
4 Natural Rubber Exporter Countries**

YEAR	HI	CR4
2006	0.25226	88.52%
2007	0.24961	88.02%
2008	0.23488	84.96%
2009	0.23168	83.02%
2010	0.23177	84.87%
2011	0.23154	84.37%
2012	0.23814	85.45%
2013	0.24391	86.35%
2014	0.23990	84.75%
2015	0.25365	84.68%
Rate	**0.24816**	**85.68%**

Herfindahl Index describes the size of the business in a the industry which became an indicator of competition among its competitors. HI value obtained from natural rubber producers is worth an average of 0.248. The value is a value close to zero which represents the relevant industry (in this case natural rubber) tends to the competitive market. The market dominance of this business is shown by CR4 value obtained, which is the sum of the market share the four largest exporters of natural rubber in the international market. Natural rubber market international within the period 2006-2015 has an average CR4 value worth 85.68% of which the value indicates a shaped market condition oligopoly. The value obtained illustrates that 86% of the international natural rubber market share is controlled by the four largest producers, in which time Thailand, Indonesia, Malaysia and Vietnam each controlled 38%, 29%, 14% and 9% share of international natural rubber market. The highest market share took place in 2006 where the market share dominated by these four producers reached 88.52% of the international market share, with each producing country controlling 38.1% by Thailand, 28.5% by Indonesia, 14.1% by Malaysia and 7.8 % by Vietnam.

Based on the results obtained from the calculations of HI and CR, then it can be said that in the period 2006-2015 the market structure faced by the three major exporting countries of natural rubber in the international market tends towards oligopoly-shaped competition. The high value of the concentration ratio illustrates that the natural rubber industry is an industry that is concentrated with relatively few producers. The existence of this condition also shows that in its development there is intense competition among producers, because there are no producers that significantly control the market. Such market conditions are reinforced by the merger the main producer of natural rubber in a container called IRCo. Policy made by IRCo in order to maintain price stability affect the reinforcement of natural rubber world trade stability. However, in general the competition of natural rubber industry in the market international has yet to show a tough competition, so that Indonesia still have considerable opportunities to compete / increase power competitiveness. Forms of business that can be taken to improve power competitiveness, among others through promotion, quality improvement, or differentiation

of types products being sold, given the competition in the form of oligopoly competing not in the price system but rather on commodity campaigns.

Competitiveness of Indonesian Natural Rubber Exports

Export competitiveness is the ability of a commodity to enter foreign markets and the ability to survive in that market. Competitiveness a commodity can be measured on the basis of a comparison of the market share of a commodity in a fixed market condition. Amir (2004) in this case states that a product is said to have competitiveness if the product able to survive in a market despite experiencing shocks Analyzer used to know comparative advantage in this research for each country exporter of natural rubber that is Revealed Comperative Advantage. The RCA index is an indicator indicates a change in comparative advantage or a change in power level a country's industrial competitiveness in the global market. The trend of RCA changes for each of the major exporting countries of natural rubber is presented in Figure 3 below

Figure 3. **RCA Value of Major Exporter Countries of Natural Rubber**
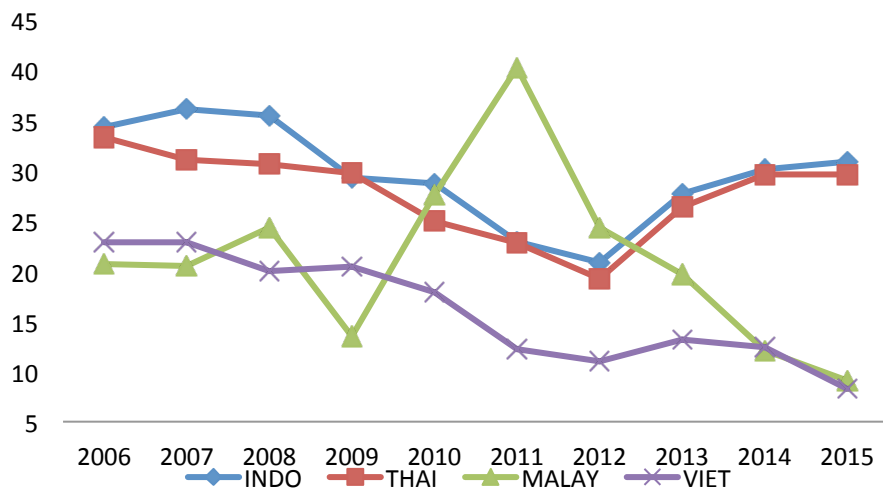
Based on the calculation result of RCA index value, it can it is seen that in general the four countries of natural rubber exporters respectively has an RCA value above zero. This indicates that both Thailand, Indonesia, Malaysia and Vietnam each have a comparative advantage over natural rubber in their trade in the international market.

Comparative advantages of Indonesia and Thailand tend to be high as the two largest producers of natural rubber. However, Indonesia has a slightly better comparative advantage compared to Thailand, at least in the last 10 years. This is because the ratio of export value of natural rubber per total Indonesian exports is higher than Thailand in the last 10 years. Indonesia's natural rubber export ratio is 0.039 or 3.9% of total exports while Thailand is only 0.037 or 3.7% of its total exports.

The decline in Thai index values has continued since 2004. In fact in 2006, this country's RCA index is already under Indonesia. This matter due to Thailand's natural rubber export performance from 2006 to 2015 has experienced a smaller average growth rate compared to Indonesia, where growth is only 5.95%, while Indonesia reaches 8.72%. In addition, the

growth of world natural rubber exports experienced a large increase (8.67%) so that this value then affects the performance of Thailand's natural rubber exports, especially to its comparative competitiveness. Indonesia has an increasing RCA value from year to year year. This illustrates that the performance of Indonesia's natural rubber exports is getting better in its development. Added area of each planting area years with improved cropping systems using superior clones making productivity improvements improving. This increase goes hand in hand with a target of the Indonesian government in which Indonesia will become an exporter the largest natural rubber with its plantation revitalization program.

To see if the world's natural rubber exporting countries have competitive advantage is done by ECI calculation (Export Competitiveness Index). The value obtained illustrates the trend of growth trend which increases or decreases. Figure 4 shows the results of the calculation of values ECI for major exporting countries of natural rubber.

Figure 4. **ECI Calculation Result of Primary Exporter of Natural Rubber**
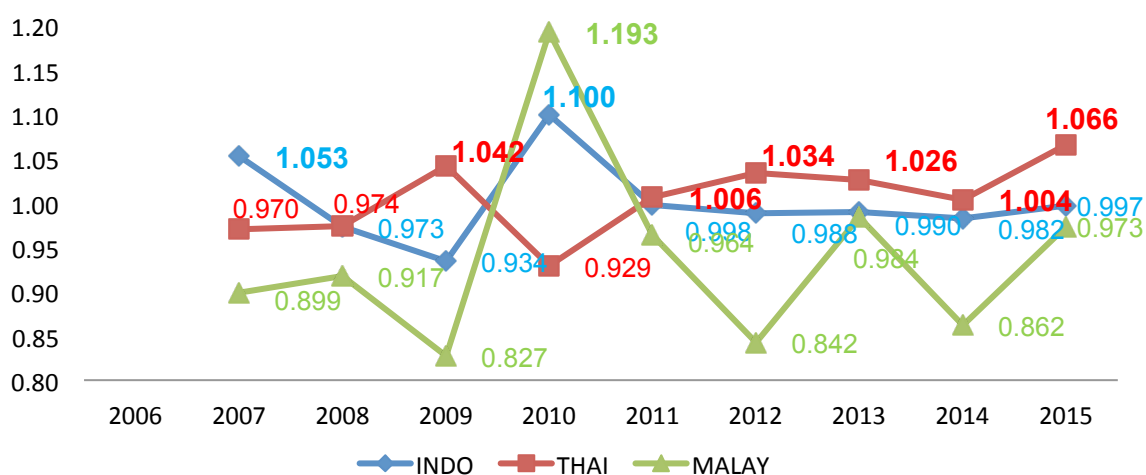
Export Competitiveness Index is an index of illustrates the competitive advantage of a commodity in a country compared to its competitors. Based on that calculation carried out on natural rubber commodities in three of the world's largest exporting countries, obtained that in the period 2011-2015, ECI Thailand has more value of 1. This indicates that Thailand's natural rubber commodity is experiencing increasing market share or competitive trend of increasingly competitive in the market international. This increase in competitiveness may be due to growth Thailand's natural rubber exports which are above export growth of natural rubber world, so the value obtained becomes larger.

Indonesia in the same period when compared to the state other exporters have less than one ECI value. It means that Indonesia's natural rubber commodities experience a declining competitiveness trend. The decline has not been in line with the efforts of the Indonesian government in terms of improvement of export performance of natural rubber in the world market with procurement revitalization and rejuvenation of old and unproductive rubber trees. The decline in the competitive competitiveness of Indonesia's natural rubber is likely due to the sluggishness of the domestic rubber industry as a result of the low price of natural rubber in the world. Significant price reductions occur due to

the decline in the price of oil during the period of 2011-2015, in which petroleum is the main raw material of synthetic rubber production. With the price of crude oil causing the price of synthetic rubber (natural rubber substitution goods) also decreased and has implications for the adjustment of natural rubber prices to keep the international market in demand.

Conclusion

Based on data and analysis results in this study, it can be drawn some conclusions as Indonesia has a tendency to increase in value exports of natural rubber commodities from year to year. Something similar happened to the two countries of natural rubber exporters of their competitors, namely Thailand and Malaysia. This increase occurs in addition to the increasing world demand of natural rubber commodities as a result of industrial development, also driven by an increase in domestic natural rubber production. The market structure that is formed on natural rubber commodities is calculated using Herfindahl Index and Concentration Ratio analysis tools shows the oligopoly-shaped market structure. Calculation of comparative advantage with RCA analysis shows that the four countries exporting natural rubber, namely Thailand, Indonesia, Malaysia and Vietnam each have a comparative advantage. Where Indonesia has a better comparative advantage than Thailand in the period 2011 to 2015. This result is different from the calculations made on competitive advantage (ECI) in which Indonesia's natural rubber commodities are not more competitive than Thailand.

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