

PAPER • OPEN ACCESS

Export performance and export competitiveness of Indonesia's CPO industry with RSPO in China and EU markets

To cite this article: H Alii *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **741** 012073

View the [article online](#) for updates and enhancements.

Export performance and export competitiveness of Indonesia's CPO industry with RSPO in China and EU markets

H Ali^{1*}, S Karimi², and R Febriamansyah³

1 Sekolah Tinggi Ilmu Ekonomi (STIE) Haji Agus Salim, Bukittinggi, Indonesia

2 Department of Economic Development of Economic Faculty, Andalas University, Padang, Indonesia

3 Department of Agribusiness of Agriculture Faculty, Andalas University, Padang, Indonesia

Corresponding author: helmi_akbary@yahoo.com

Abstract. The implementation of the RSPO [Roundtable on sustainable palm oil] has been implemented since 2012 in the UE market, but the Chinese market has not. This study aims to describe and compare the export performance and export competitiveness of Indonesia's CPO [crude palm oil] trade in both markets. Descriptive analysis was carried out on export performance and export competitiveness in the markets of China and the European Union [EU-25]. Statistical analysis used analysis compare means independent sample t-test and paired samples test. The results of the descriptive analysis found that there were significant differences in export performance and export competitiveness of Indonesia's CPO trade in the China and EU-25 markets, with an average RCA to the Chinese market [23.65%], while the EU-25 market [109.27%]. The results of the comparison mean analysis of the independent sample t-test showed that there was no difference in trade value, but there was a significant difference in the trade quantity in the China and EU-25 markets There is a significant difference in the export competitiveness of Indonesia's CPO trade in the China and EU-25 markets The results of the compare means paired samples test showed that there was no significant difference in the performance of Indonesia's CPO exports to the China and European Union markets. However, there are differences in the competitiveness of Indonesian CPO exports in the Chinese and EU-25 markets due to the RSPO policy. This study recommends that in the future the RSPO should become a reference for developing the CPO export market.

Keywords: Export performance, export competitiveness, industrial crude palm oil, roundtable sustainable palm oil, and international market

1. Introduction

Palm oil is obtained from the fruit of the African palm oil tree [*Elaeis guineensis*] [1]. Palm oil is Indonesia's leading export commodity to Asian countries, such as India, China, and Pakistan as well as the United States and European Union countries. Palm oil is a vital component of Indonesia's development strategy now and in the future. Indonesia is the world's largest producer and exporter of



Crude Palm Oil [CPO] and CPO is an important component of food security in Indonesia and its consuming countries [2] [3]. The RSPO policy has a positive and significant impact on export performance and export competitiveness in the Indian and US markets [4]. Indonesia's foreign exchange revenue per year from raw CPO commodities reaches 80% of the total export value of the mainstay agricultural commodities in Indonesia, namely CPO, tea, coffee, cocoa, tuna, and shrimp [5].

The average growth rate of Indonesia's CPO exports for the period of 2001–2015 was 11.94% per year. It was far below those of Thailand, Malaysia, and Colombia with growth rates of 59.55%, 25.19%, and 20.35% per year respectively in the same period. That condition was worsened by higher tax enforcement on Indonesian CPO in EU countries in 2012 causing Indonesia to shift its CPO exports to India, China, and Pakistan [6]. Palm oil is one of the world's most consumed vegetable oils other than soybean oil, canola oil, and sunflower seed oil. Indonesia is one of the largest CPO producers in the world, while China is the biggest consumer in Indonesia as well as in the world [7]. Palm oil has an important position in the Indonesian economy. First, palm oil is the main export commodity for a major foreign exchange earner. According to the Ministry of Agriculture [2016], of the twelve international trade commodities, palm oil ranks first for exports in 2015 amounting to 81.36% with a value of 15.38 billion US dollars. Second, palm oil is used as the main source of domestic cooking oil.

World CPO production in 2013 reached 55.7 million tons. From a total of 55.7 million tons of CPO, Indonesia contributed 26.70 million tons [produced from six million hectares of plantation land], and Malaysia was followed by 21.7 million tons [produced from five million hectares of plantation land], so that Indonesia and Malaysia together -ama controls about 86% of the world's CPO [8]. Indonesia's CPO production at the end of 2015 increased to 32.5 million tonnes and Malaysia's decreased to 17.7 million tonnes [9].

Indonesia's role as a major producing country is also the largest CPO exporter in the world in terms of volume and quantity followed by Malaysia, Thailand, Colombia, and Nigeria. Indonesia is the largest CPO exporting country in the world because there are so few CPO derivative products that can be processed domestically in Indonesia, even though CPO derivative products are very diverse [10]. Indonesia is only able to process CPO into derivative products amounting to 59.66% and exports 40.34% of CPO in its raw form. The ability to process Indonesian CPO is still far from that of Malaysia. Malaysia only exports raw CPO at 17.5% and exports 82.5% CPO which has been processed into various products [5]. Indonesia's inability to process overall CPO-derived products has led domestic producers to export CPO to CPO-processing countries such as China, India, Pakistan, the Netherlands, and several European Union countries [11].

The RSPO [Roundtable on sustainable palm oil] policy has been implemented since 2012 in the European Union market, while the Chinese market has yet to ratify the RSPO. The most important aspect of SPPO is ensuring that rainforests are not cleared for the development of new plantations [12], environmentally sound factory waste management [13], and a zero-burning policy [12]. RSPO members account for approximately 35% of the palm oil produced worldwide.

This study aims to describe and compare the export performance and export competitiveness of Indonesia's CPO trade in the China and EU markets with the implementation of RSPO policies since 2012. Are there differences in export performance before the RSPO for the 2006-2011 period and after the 2012-2017 RSPO period in the Chinese market and the European Union. It is hoped that this research can contribute to the post-ratification of the RSPO policy in the oil palm industry trade in the international market.

2. Materials and methods

2.1. Data sources

Sources of data used in this study are statistical data from the Central Statistics Agency [BPS], and data and analysis from the COMTRADE Statistics International Trade Center [ITC], as the main data.

Meanwhile, supporting data from the Ministry of Industry of the Republic of Indonesia, United Nations Commodity Trade Statistics, scientific papers related to competitiveness. and strategy. oil palm development, as well as export and import data of CPO [HS code 151110].

2.2. Calculation of time series data on Export Performance and Competitiveness of Indonesian CPO commodity exports in the international market

The measurement of export performance is carried out to describe the development of Indonesian CPO exports in the Chinese and European Union markets for the period 1996-2017. Trade value and trade quantity are seen as developments by measuring the rate of export growth. This descriptive comparison predicts how the development of Indonesia's CPO exports in the two countries. The competitiveness and market share of Indonesia's CPO exports are used the Revealed Comparative Advantage [RCA] indicator and the market share index. In this study, RCA is used to measure the competitiveness of comparative advantage. According to Batra and Khan [14], the RCA index is formulated as follows:

$$RCA_{ij} = \frac{X_{ij} / X_{iw}}{X_{wj} / X_w}$$

X_{ij} = Exports value of commodity i in country j

X_{iw} = Total exports value of commodity i in country j

X_{wj} = Exports value of commodity i in the world

X_w = Total world exports value.. [14]

2.3. Comparative analysis in quantitative statistics

After describing the comparison descriptively, it is followed by quantitative analysis. The quantitative comparative analysis uses compare means analysis of independent sample-t-test and compare means of paired samples test. The RSPO policy is used as a differentiator in trade policy, where the European Union market has consistently implemented it, while the Chinese market has not ratified the RSPO policy. To answer the question of whether there is an impact of RSPO policies on these two markets, data is used before the RSPO for the 2006-2011 period and after the RSPO for the 2012-2017 period. Data were processed using the SPSS 22.00 program.

3. Result and discussion

3.1. Indonesia's CPO Export Performance in the China Market

Indonesia's CPO export performance is seen from the development of trade flow [value and quantity] for the period 1996-2017 towards the Chinese market. Indonesian CPO exports in 1996 amounted to USD 43,621.01 thousand and a quantity of 9,1781,732 tons continued to increase, the highest in 2011 was a trade value of USD 5,708,605 thousand and the trade quantity in 2012 was 5,648,914.654 tons. The development of trade value and trade quantity in 1996-2012 continued to increase and after that, it decreased until 2017, as seen in Figure 1 below.

The growth rate of Indonesian CPO trade in the Chinese market can be seen in Figure 2, starting with fairly high growth in 1997, with a trade value of 94.35% and a trade quantity of 93.67%. After that, it continued to decline in fluctuations and the highest increased by 47.35% in 2002. However, in 2011 there was an increase 2011 of 27.06%. After that, the growth has slowed down and continues to be negative, it could be due to the RSPO policy. Growth again improved with a growth rate of 11.99% in 2017. During the 1996-2017 period, the average growth in trade value and trade quantity in the Chinese market was 6.95% and -1.23%. The trade value is higher than the trade quantity because the price of Indonesian CPO in the Chinese market continues to increase.

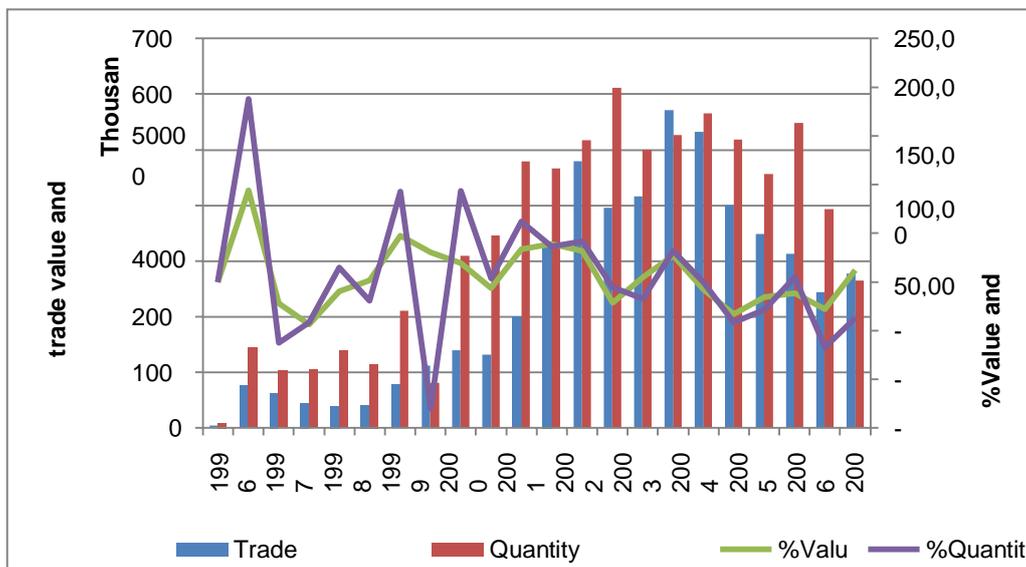


Figure 1. Trend of trade value and quantity along with the rate of growth of Indonesia’s CPO export in the China market

The description of the trade value and trade quantity and the rate of growth can be seen in the following figure 2.

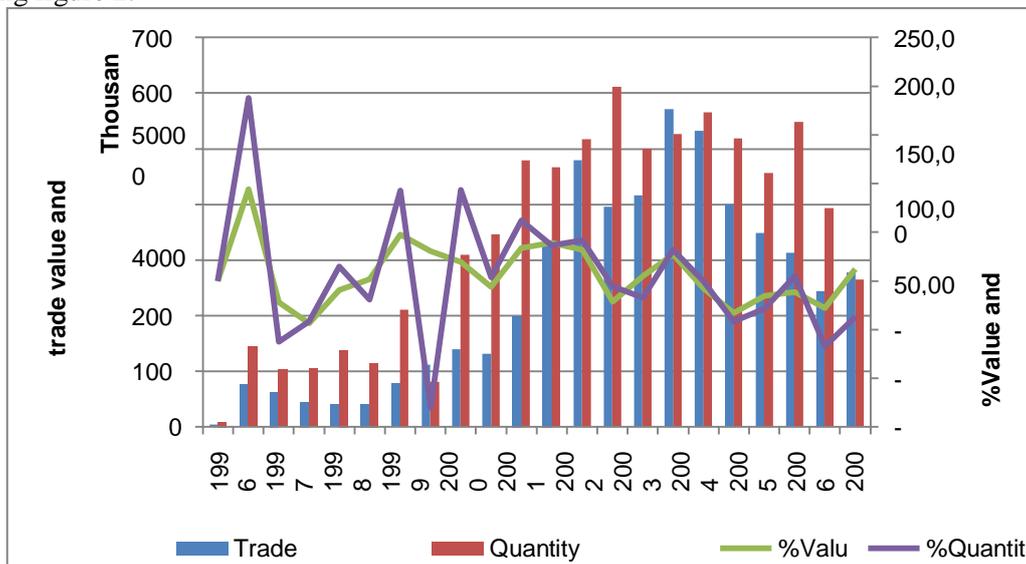


Figure 2. : Trend of trade value and quantity along with the rate of growth of Indonesia’s CPO export in the China market

3.2. Indonesian CPO Export Performance in the European Union Market

Indonesia's CPO export performance is seen from the development of trade flow [value and quantity] for the period 1996-2017 against the European Union market. Indonesian CPO exports in 1996 amounted to USD 774,326.4 and the quantity was only 1,337,340.9 tonnes and continued to slope until 1999. The increase starting in 2008 was USD 5,815,264 valued at 6,327,250.8 tonnes. The highest

trade value development in 2014 was USD 860,366.1 and the trade quantity in 2015 was 8530 120.3 tonnes. The average growth rate for the 1996-2017 trade value and trade quantity was 5.92% and 2.51% per year, as shown in Figure 3 below.

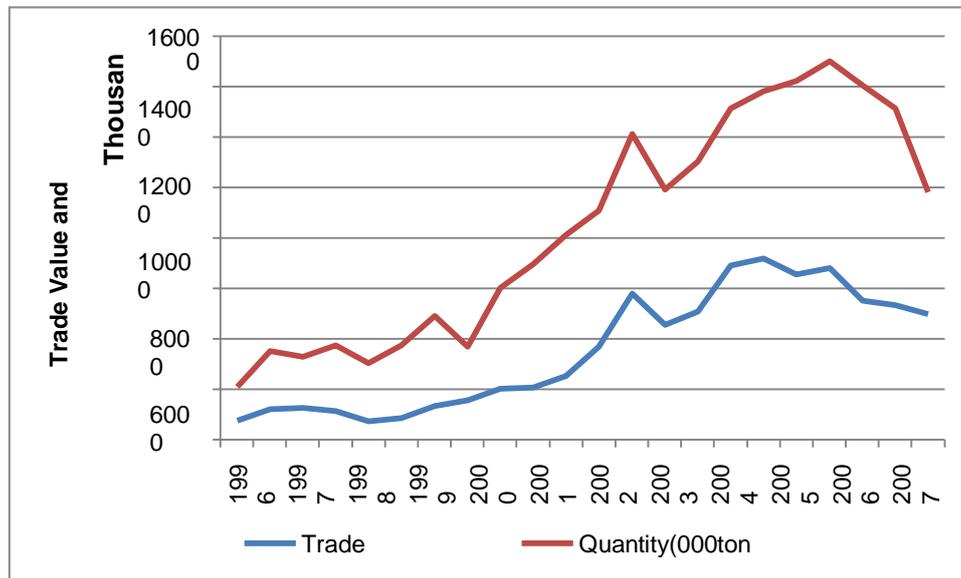


Figure 3. Trend of trade value and quantity of Indonesia's CPO export in the EU market

A description of the development of trade value and trade quantity and their growth rate is shown in Figure 4 below. The average growth in trade value in the 1996 period experienced an increase in 1997 and decreased sharply in 2000 by -53.83%. However, the trade quantity has decreased in 1998 by -14.05% and in 2000 by -12.78%. The tendency of trade value and quantity to fluctuate down. The growth rate of trade value and trade quantity in the European Union market seemed to fluctuate with an average growth rate of 5.93% and 2.51% per year for the 1996-2017 period. This condition can illustrate that the negative quantity growth rate, could be the result of the Indonesian CPO export quality standardization policy that must include RSPO certification. It is interesting to examine more deeply, whether the quantity has dropped further, but the trade value is still positive. More details can be seen in Figure 4 below.

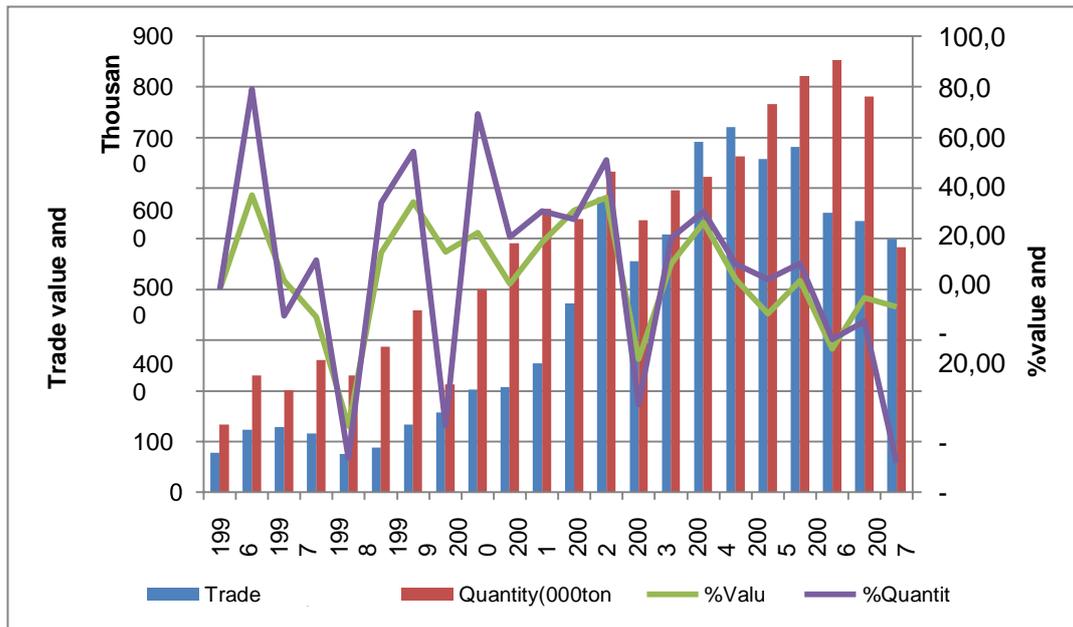


Figure 4. Trend of trade value and quantity along with the rate of growth of Indonesia’s CPO export in the EU market

3.3. Description of Comparison of Export Performance and Export Competitiveness

The comparison description of the trade value, trade quantity, and RCA index of Indonesian CPO trade in the Chinese market is shown in Figure 5. Trade value and trade quantity fluctuated from 1996-2007, export competitiveness was quite good in 1996 with an RCA index of 89.19% and after that decreased sharply to the lowest in 2003 with an RCA index of 0.06%. After that, it fluctuates again and increases the competitiveness of Indonesia's CPO exports starting to increase until 2016 by 67.40% and the highest with an RCA index of 78.44% in 2016, as seen in figure 5 and table 1 below.

Table 1. A descriptive comparison of Trade Flow [value and quantity] and RCA of Indonesian CPO in the China and European Union markets for the period 1996-2017.

Tahun	China			Uni Eropa-25		
	Trade Value [000\$]	Quantity [000ton]	RCA [%]	Trade Value [000\$]	Quantity [000ton]	RCA [%]
1996	43621.0	91782	38.7	774326.4	1337340.93	122.05
1997	772678.	1450000	11.38	1233573	2300581.42	109.19
1998	634791.	1030000	5.85	1279113	2017177.63	53.73
1999	443191.	1050000	13.24	1153442	2601568.03	80.69
2000	404844.	1390000	15.26	749828.9	2306853.4	78.81
2001	411893.	1150000	13.46	877667.5	2873245.81	83.97
2002	782251.	2110000	13.98	1339415	3583266.55	104.89

2003	1124567	811000	19.86	1571687	2126562.39	80.90
2004	1399906	3100000	25.81	2024309	4006296.44	105.39
2005	1315666	3460000	23.98	2071087	4907590.91	118.43
2006	1992786	4790000	22.15	2547318	5589336.39	111.80
2007	3275127	4670000	19.18	3708218	5392979.2	120.33

2008	4800377	5170000	19.59	5815264	6327250.82	133.55
2009	3961910	6110000	25.01	4562310	5366863.01	131.23
2010	4163730	5000000	27.64	5089624	5959179.19	123.43
2011	5708605	5260000	18.95	6917305	6224279.6	87.28
2012	5317763	5650000	26.16	7207945	6624990.33	99.21
2013	4007467	5190000	24.24	6575815	7656317.8	129.56
2014	3484300	4570000	35.77	6817312	8205715.71	139.97
2015	3129019	5480000	45.98	5521166	8530120.26	128.46
2016	2444729	3940000	41.54	5347386	7802526.84	128.50
2017	2777930	2650000	32.5	5002036	4831791.04	132.65
Total	52397155	74122781.7		7818614	106571834	
Mean	2381689	3369217.35	23.65	3553916	4844174.26	109.27

Source: Data processed, UN Comtrade [2019]

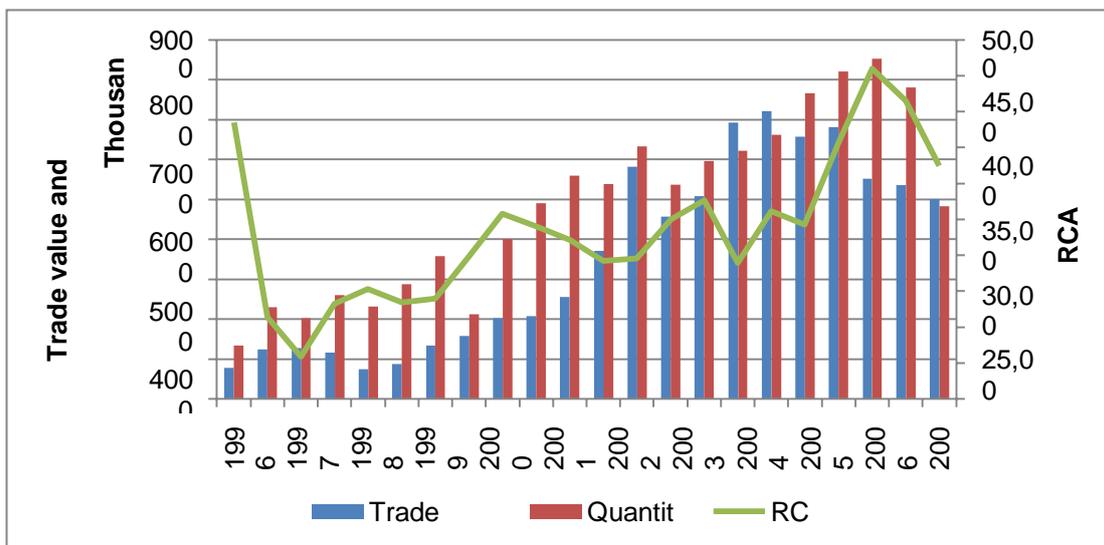


Figure 5. Trend of trade value, quantity, and RCA-index of Indonesia's CPO export in the China market

A description of the comparison of export performance and the competitiveness of Indonesian CPO exports in the European Union market is shown in Figure 6 and Table 1 below. Unsatisfactory export performance can be seen from 1996-2004 and the competitiveness of exports in 1997 also with the RCA index of 122.05%, which continued to fluctuate until 2003 the RCA index was 80.90%. Meanwhile, in 2004-2010 it increased with the RCA index ranging from 105.39% to 123.43% in 2010. 2011-2012 was the period when the RSPO policy was implemented, the RCA index fell only 87.28 and 99.21%. In the 2012-2017 period, the RCA index increased again, ranging from 129.56%, continuing to increase in 2017 to 132.65%. The reality seems to show that the RSPO policy has improved the competitiveness of Indonesia's CPO exports in the European Union market, which increasingly requires CPO for its industry. The complete comparison of export performance and export competitiveness of Indonesian CPO can be seen in Table 3 below.

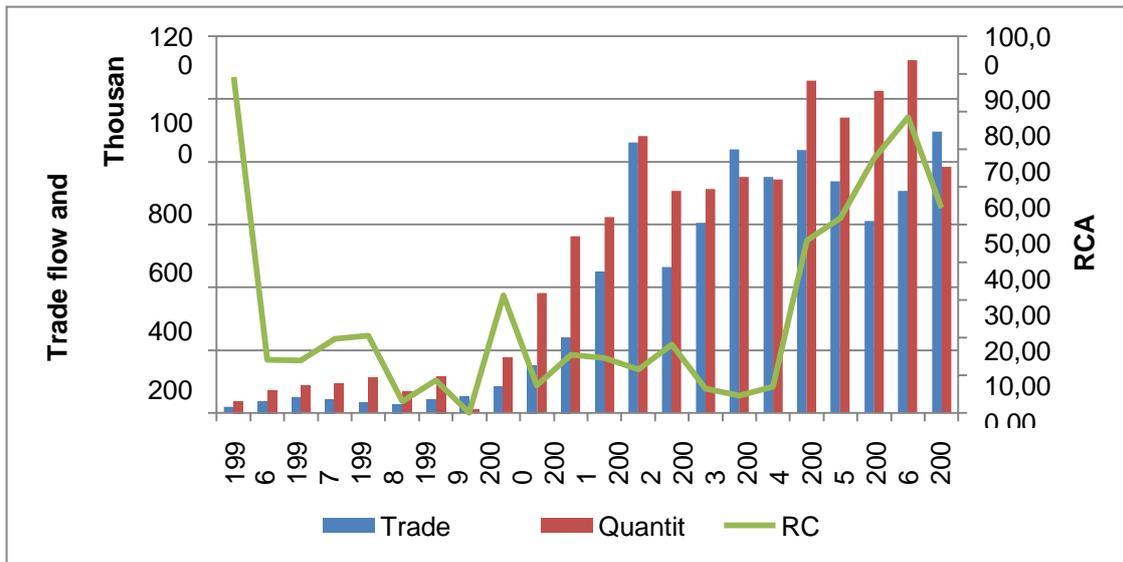


Figure 6. Trend of trade value, quantity, and RCA-index of Indonesia's CPO export in the UE-25 market

3.4. Analysis of compare means independent samples t-test with RSPO

Analysis of differences in export performance and the competitiveness of Indonesian CPO exports with RSPO policies in the Chinese non-RSPO market with the European Union market which is RSPO, a comparison means independent samples t-test was conducted, as shown in tables 4, 5, and 6 below.

Table 2. The output compares the means of the independent sample t-test RCA and trade flow CPO for the China and EU-25 market

China_UE25		N	Mean
TradeValue_CPO	China	22	2381688.8550
	UE25	22	3553915.8236
TradeQuanti_CPO	China	22	3369217.3636
	UE25	22	4844174.2591
RCA_CPO	China	22	23.6468
	UE25	22	109.2736

Sumber : Data diolah, UN Comtrade [2019]

The average trade value of the China and European Union markets for the period 1996-2017 was 2,381,688.86 USD and 3,553,915.82 USD with a trade quantity of China 3369217.36 tonnes and EU-25 4844174.26 tonnes. Meanwhile, China's RCA is 23.65% lower than the EU-25 at 109.27% per year. Descriptively, UE-25's trade flow and RCA are better than India's. This difference could be caused by the RSPO policy, where the EU-25 has consistently enforced the RSPO since 2012, while the Indian market still does not pay attention to the RSPO certificate as a condition for acceptance of Indonesian CPO imports. Analysis of compare means on independent samples t-test is seen from three variables, namely trade value, trade quantity, and RCA index.

Table 3. Output test results compare means independent sample t-test RCA and CPO trade flow in China and EU-25 markets.

Independent Samples Test						
	Levene's Test for Equality of Variances		t-test for Equality of Means			
		Sig.	t	df	Sig. [2-tailed]	
TradeValue_ CPO	Equal variances assumed	5.673	.022	-1.872	42	.068
	Equal variances not assumed			-1.872	39.033	.069
TradeQuanti_ CPO	Equal variances assumed	.241	.626	-2.355	42	.023
	Equal variances not assumed			-2.355	41.234	.023
RCA_CPO	Equal variances assumed	13.745	.001	-15.900	42	.000
	Equal variances not assumed			-15.900	29.017	.000

Source: Processed data, UN Comtrade [2019]

The value of Levene's test results on the two variables of trade value and the trade quantity t-calculated value of the trade value is sig. 0.022 < 0.050, and the RCA index is sig. 0.001 < 0.050, which means there is no difference in meaning. Assessment is made by seeing "equal variance nor assumed". Meanwhile, the trade quantity with the t-count value is sig. 0.626 > 0.050, which means there is a difference in meaning so that the assessment is made by looking at the "equal variance assumed". It can be concluded that there is no significant difference in the trade value of Indonesian CPO trade to the Chinese and European Union markets [sig. 0.069 > 0.050]. Meanwhile, the trade quantity for Indonesian CPO exports to the Chinese and European Union markets has a significant difference [sig. 0.023 < 0.050]. The difference in trade value that is not different and the trade quantity is significantly different, it can be caused by the variable price and quality standards as a result of the RSPO policy. However, there is a significant difference in the competitiveness of Indonesia's RCA index to the China and European markets [sig. 0.000 < 0.005].

Based on the above discussion, it can be taken on average that it is significant [2-tailed] in the t-test column for export performance [trade value and trade quantity], which is sig. 0.046 < 0.050, which means that there is a significant difference in export performance in the Indonesian CPO trade in the Chinese market with the European Union. However, there is a significant difference in export competitiveness in Indonesia's CPO trade in the Chinese and European Union markets, which is indicated by the RCA index with a Sig value of 0.000 < 0.050.

Based on the "independent sample test" output table in the "equal variances assumed" section, the Sig. [2-tailed] of 0.000 < 0.05, so as the basis for decision making in the independent test sample t-test it can be concluded that H₀ is rejected and H_a is accepted. Thus it can be concluded that there is a significant difference [real] between the average RCA CPO index to the Chinese and European Union markets. The difference between the average RCA to the China and European Union markets is 7.26455 and the difference between the average is -96.64068 to -74.061296 [95% Confidences interval of the Difference Lower Upper].

3.5. Analysis of compare means paired samples to test with RSPO

Analysis of differences in export performance and data on the competitiveness of Indonesian CPO exports with policies before and after the RSPO in the China and UE-25 markets was conducted by comparing means paired samples test. The test was carried out with three variables, namely the

variable trade value, trade quantity, and the RCA index on the Chinese and European Union markets before the RSPO for the 2006-2011 period and after the 2012-2017 period.

Analysis of the differences in export performance and export competitiveness of Indonesian CPO with before and after the RSPO in China and the UE-25 market, a test comparing means paired samples test was conducted. The test was carried out with three variables, namely the variable trade value, trade quantity, and the RCA index against the Chinese and UE-25 markets for the period before RSPO 2006-2011 and after the 2012-2017 RSPO.

A comparison means analysis of paired sample tests was conducted by looking at the differences between the Chinese market as a non-RSPO market and the UE-25 market as the RSPO market. The difference between the two markets is before the RSPO for the 2006-2001 period and after the 2012-2017 period, with indicators of trade flow value, trade flow quantity, and RCA. The results of the paired analysis are shown with N-6 so that they become 6 pairs. The mean trade flow value and quantity show a higher difference before RSPO than after RSPO for the Chinese market. Meanwhile, the competitiveness with Indonesia's RCA CPO index in the Chinese market before the RSPO was 22.09%, and after the RSPO was higher at 34.37 \$. The competitiveness of Indonesia's RCA CPO has increased significantly with the application of the RSPO. In contrast to the trade flow value, the trade flow quantity and RCA of Indonesian CPO to the European Union market increased quite high, as well as the competitiveness of Indonesia's RCA index was higher after the RSPO at 126.39% compared to before the RSPO RCA index of 117.94%. This shows the positive impact of export performance and the competitiveness of Indonesian CPO exports with the implementation of RSPO in the Ue-25 market.

Table 4. Output paired sample statistics of Indonesia's RCA CPO in the Chinese and EU-25 markets

Paired Samples Statistics			
		Mean	N
Pair 1	TraValue_beforeRSPO-China	3983755.8333	6
	TraValue_afterRSPO_China	3526868.0000	6
Pair 2	TraQuanti_beforeRSPO_China	5166666.6667	6
	TraQuantity_afterRSPO_China	4580000.0000	6
Pair 3	RCA_beforeRSPO_China	22.0867	6
	RCA_afterRSPO_China	34.3650	6
Pair 4	TraValue_beforeRSPO_UE25	4773339.9548	6
	TraValue_afterRSPO_UE25	6078609.9832	6
Pair 5	TraQuanti_beforeRSPO_UE25	5809981.3687	6
	TraQuantity_afterRSPO_UE25	7275243.6633	6
Pair 6	RCA_beforeRSPO_UE25	117.9367	6
	RCA_afterRSPO_UE25	126.3917	6

Source: Processed data, UN Comtrade [2019]

The comparison of trade flow [value and quantity] and RCA trade of Indonesian CPO in the Chinese market are being compared in three groups, namely 1] trade value before and after RSPO 2] trade quantity before and after RSPO and 3] RCA before and after RSPO, with before RSPO for the 2006-2011 period and after the RSPO for the 2012-2017 period. Likewise, the UE-25 market, which is grouped into three groups, namely 1] trade value before and after RSPO, 2] trade quantity before and after RSPO, and 3] RCA before and after RSPO, with before RSPO for the 2006-2011 period and after RSPO. 2012-2017 period.

Table 5. The output comparison means paired samples correlation RCA CPO Indonesia in China and EU-25 markets

		Paired Samples Correlations		
		N	Correlation	Sig.
Pair 1	TradeValue_beforeRSPO-China & TradeValue_afterRSPO_China	6	-.823	.044
Pair 2	TradeQuantity_beforeRSPO_China & TradeQuantity_afterRSPO_China	6	.024	.964
Pair 3	RCA_beforeRSPO_China & RCA_afterRSPO_China	6	.691	.128
Pair 4	TradeValue_beforeRSPO_UE25 & TradeValue_afterRSPO_UE25	6	-.674	.142
Pair 5	TradeQuantity_beforeRSPO_UE25 & TradeQuantity_afterRSPO_UE25	6	-.359	.485
Pair 6	RCA_beforeRSPO_UE25 & RCA_afterRSPO_UE25	6	.197	.708

Source: Processed data, UN Comtrade [2019]

The paired samples correlation test shows the trade value of Indonesian CPO exports in the Chinese market before the RSPO and after the RSPO there is a negative correlation and correlation [sig.0.044 <0.050], but the trade quantity correlates [sig. 0.024 <0.050]. Likewise, the RCA index before RSPO and after RSPO in the Chinese market does not correlate [sig. 0.691 > 0.050]. Meanwhile, the trade value and trade quantity in the EU-25 market before and after the RSPO, where the trade value does not have a negative correlation and correlation [sig. -0.674 > 0.050] and the trade quantity also has no correlation and negative correlation [sig. -0.359 > 0.050], while the competitiveness of CPO exports with the RCA index does not correlate [sig.0.197 > 0.050]. More details can be seen in table 5 above.

The results of the paired samples test show that there is no significant difference [sig.0.633 > 0.050] in the trade value before and after the implementation of the RSPO on the Chinese market, as well as there is no significant difference in the trade quantity [sig. 0.297 > 0.050] of Indonesia's CPO exports with before and after the implementation of the RSPO. Meanwhile, export competitiveness with the RCA index shows that there is a significant difference [sig. 0.006 <0.050] in Indonesia's CPO exports before and after RSPO in the Chinese market.

Table 6. Output Paired samples test RCA Indonesian CPO in China and EU-25 Markets

		Paired Samples Test		
		t	df	Sig. [2-tailed]
Pair 1	TradeValue_beforeRSPO-China - TradeValue_afterRSPO_China	.508	5	.633
Pair 2	TradeQuantity_beforeRSPO_China - TradeQuantity_afterRSPO_China	1.163	5	.297
Pair 3	RCA_beforeRSPO_China - RCA_afterRSPO_China	-4.581	5	.006
Pair 4	TradeValue_beforeRSPO_UE25 - TradeValue_afterRSPO_UE25	-1.419	5	.215
Pair 5	TradeQuantity_beforeRSPO_UE25 - TradeQuantity_afterRSPO_UE25	-2.299	5	.070
Pair 6	RCA_beforeRSPO_UE25 - RCA_afterRSPO_UE25	-1.049	5	.342

Source: Processed data, UN Comtrade [2019]

While the EU-25 market coincides with the Chinese market, with the implementation of the RSPO policy, it can be concluded that there is no significant difference in export performance with the trade

value indicator [sig.0.215 > 0.050], as well as trade quantity [sig.0.070 > 0.050]. At the same time, export competitiveness with the RCA index indicator also does not have a significant difference [sig.0.342 > 0.050] in Indonesian CPO exports in the EU-25 market with the application of RSPO before and after, as seen in the table above.

4. Conclusion

The results of the study describe a positive increase in Indonesian CPO trade to the Chinese market by 6.95%, with an average traded value of 6.95% and a trade quantity of -1.23%. The trade value in the European Union market is 5.92%, with an average traded value of 5.92% and a trade quantity of 2.51%. The difference in the increase in the trade quantity in the Chinese market and the European Union market can be caused by the better prices of commodities in the Chinese market.

The results of statistical tests compared to the mean independent sample t-test show that there is no significant difference in the trade value of Indonesian CPO trade in the Chinese and European Union markets. The RSPO policy does not affect the EU market because comparing the mean paired sample test shows that in the Chinese and European Union markets there is no difference in export performance.

Acknowledgments

Acknowledgments were conveyed by the author to Prof. Rina Oktaviani [deceased], and ITAPS staff [International Trade Analysis and Policy Studies] Bogor Agricultural University, Miss Syarifah Amalia, and Mr. Fazril for the assistance of initial ideas and information about exports and competition in Indonesia's CPO trade; and the Central Statistics Agency [BPS], the UN Comtrade, and the USDA which have helped the writer get the information and data needed in writing this article. Furthermore, the authors thank the promoter for providing direction in the completion of this paper.

References

- [1] Schuster G, Smits W, and Ullal J. 2007. Thinkers of the Jungle: The Orang-utan Report.
- [2] Lee KT and Goh SC. 2010. Will biofuel project in Southeast Asia become white elephants? *Elsevier Ltd. Energy Policy*, 38: 3847-3848.
- [3] Fauzi Y, Widyastuti YE, Satyawibawa I, and Paeru RH. 2012. Kelapa sawit. Depok [ID]: Penebar Swadaya
- [4] Ali, H, S. Karimi, and R. Febriamansyah. 2020. IOP Conf. Ser.: Earth Environ. Sci.497 012043. IOP Publishing
- [5] Rifai N. 2014. Evaluasi kebijakan ekonomi ekspor minyak sawit dan produk turunannya ke pasar Amerika Serikat [Disertasi]. Institut Pertanian Bogor.
- [6] Prasetyo A and Marwanti S. 2017. Comparative Advantage and Export Performance of Indonesian Crude Palm Oil in International Markets, *Jurnal Agro Ekonomi*, Vol 35[2]: 89–103.
- [7] Nurcahyani M, Masyhuri M, and Hartono S. 2018. The export supply of Indonesian crude palm oil [CPO] to India. *Agro Ekonomi*, 29[1]: 19-31.
- [8] Mukherjee I and Sovacool BK. 2014. Palm oil-based biofuels and sustainability in Southeast Asia: a review of Indonesia, Malaysia, and Thailand. *Renew Sustain Energy Review*, 37:1-12.
- [9] United States Department of Agriculture [USDA]. 2017. Oil seeds: world market and trade. Washington [US]: Foreign Agricultural Service United States Department of Agriculture.
- [10] Hoffmann MP, Vera AC, van Wijk MT, Giller KE, Oberthür T, Donough C, and Whitbread AM. 2010. Simulating potential growth and yield of oil palm [*Elaeis guineensis*] with PALMSIM: model description, evaluation and application. *Agricultural System*, 131: 1-10.
- [11] Peñaranda RM, Gasparatosb A, Strombergc P, Suwad A, Pandyaswargoe AH, Oliveira JAP. 2015. Sustainable production and consumption of palm oil in Indonesia: what can stakeholder perceptions offer to the debate? *Sustainable Production and Consumption*, 4:

- 16–35.
- [12] Fitzherbert E, Struebig M, Morel A, Danielsen F, Brühl C, Donald P, and Phalan B. 2008. How will Oil Palm expansion affect biodiversity? *Trends in Ecology and Evolution*, 23[10]: 538-545.
- [13] Siggel, E. 2006. International Competitiveness and Comparative Advantages : A Survey an a proposal for Measurement. *Journal of Industry,. Competition, and. Trade*, 6: 137-159.
- [14] Batra A, Khan Z. 2005. Revealed comparative advantage: an analysis for India and China. *Working Paper* 168:1–52