DYNAMICS OF INDONESIAN ROBUSTA COFFEE COMPETITION AMONG MAJOR COMPETITOR COUNTRIES

DINAMIKA PERSAINGAN KOPI ROBUSTA INDONESIA DENGAN NEGARA-NEGARA PESAING UTAMA

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ABSTRAK

Fluctuations in Indonesian Robusta coffee exports occurred along with a declining trend in coffee exports compared to major competitor countries over the past fifteen years. This research aimed to analyze the dynamics of the competitiveness of Indonesian Robusta coffee exports and the level of competition among the major competitor countries such as Vietnam and India. The methods used are *Revealed Comparative Advantage* (RCA), *Dynamic Revealed Comparative Advantage* (DRCA), and *Rank Spearman Correlation*. These methods were selected to analyze changes in competition level within 15 years' time dimension (2000−2015) as well as to analyze the relationships among competing countries, which may affect Robusta coffee market of each country. The analysis showed that Indonesia's coffee competitiveness tends to increase compared to the two major competitors of Robusta coffee exporter of the worldwide, such as Vietnam and India. However, Indonesia's coffee competitiveness is still a half below Vietnam. The Indonesian coffee competitiveness against Vietnam and India is not significantly correlated due to the different markets of export destination countries. Increasing competitiveness and the strength of competition in export market can be done through quality improvement and continuity of domestic Robusta coffee in accordance to the demand of world consumers.

Keywords: Competitiveness, DRCA, rank spearman correlation, RCA, Robusta coffee

ABSTRACT

Dalam kurun waktu lima belas tahun terakhir, terjadi fluktuasi ekspor kopi Robusta Indonesia dengan kecenderungan yang semakin menurun dibandingkan negara pesaing utama. Tujuan penelitian adalah menganalisis dinamika daya saing ekspor kopi Robusta Indonesia dan tingkat persaingan antar negara pesaing utama, seperti Vietnam dan India. Metode yang digunakan, yaitu Revealed Comparative Advantage (RCA), Dynamic Revealed Comparative Advantage (DRCA), dan Rank Spearman Correlation. Metode tersebut digunakan untuk menganalisis perubahan tingkat persaingan dalam dimensi waktu 15 tahun (2000−2015) serta menganalisis hubungan antar negara pesaing yang dapat memengaruhi pasar kopi Robusta setiap negara. Hasil analisis menunjukkan daya saing kopi Indonesia cenderung meningkat dibandingkan dua pesaing utama pengekspor kopi Robusta dunia, seperti Vietnam dan India. Namun, daya saing kopi Indonesia masih setengah kali di bawah Vietnam. Persaingan kopi Indonesia dengan Vietnam dan India tidak berkorelasi signifikan karena perbedaan pasar negara tujuan ekspor. Peningkatan daya saing dan kekuatan kompetisi di pasar ekspor dapat dilakukan melalui peningkatan kualitas serta kontinuitas kopi Robusta domestik sesuai dengan permintaan konsumen dunia.

Kata Kunci: *Daya saing, DRCA, kopi Robusta, korelasi rank spearman, RCA*

INTRODUCTION

As one of major coffee producing countries in the world, Indonesia has an opportunity to improve coffee export to international market, which can be seen from an increase in world coffee consumption of 8.47% during 2011–2016 (ICO, 2016a) and domestic coffee production for the last three years (2013–2015), that was 11.89%. Also, a relatively low level of domestic coffee consumption becomes the driving factor to enhance coffee export. However, there was a significant decrease in the export rate of Indonesian coffee by 19.78% for the last three years. Less satisfactory export performance adversely affected Indonesian coffee competitiveness (Kementerian Pertanian, 2014), (Dradjat, Agustian, & Supriatna, 2007).

Indonesia ranks the fourth among the world major coffee exporters after Brazil, Vietnam, and Colombia (Table 1). Production of Indonesian Robusta coffee reached 74%, while the remaining was from Arabica coffee production (Direktorat Jenderal Perkebunan, 2015). During the period 1990–2015, Indonesia experienced a decrease in exports of 0.0061%. In contrast, coffee export in Brazil, Vietnam, and Colombia increased by 1.06%, 17.58%, and 0.0056%, respectively. Less progress in Indonesian coffee export may be caused by several factors such as the productivity and quality of coffee. The amount of coffee exported will determine the competitiveness of Indonesian coffee in the international market. Increasing Indonesian coffee competitiveness in the international market requires steps to improve performance and supportive export policy for coffee (Dradjat *et al.*, 2007). The steps include quality improvement, elimination of operating cost in the port, tax abolition or tax allowance and provision of low interest export credit. Export subsidies can be provided to motivate the entrepreneurs (exporters) in order to increase coffee exports (Baroh, Hanani, Setiawan, & Koestiono, 2014), which caused complexities on trades are due to lack of harmonization in standards (Nugroho, 2014).

Increasing Indonesian coffee competitiveness can also be done through market diversion and penetration to other countries such as Korea, ASEAN countries, USA, and European countries due to the increasing trend of coffee demand (Kementerian Pertanian, 2014). Other strategy is by improving the mechanisms of certification schemes (Arifin, 2013). Competitiveness of country may change, influenced by price and non-price factors (Fleming & Tsiang, 1956). Price factors consist of the differences in productivity levels, changes in exchange rate and tax, and the difference in rate increase of national price level. Non-price factors include export quality, improvement in marketing efficiency, and the difference in export demand fulfillment. Therefore, a more comprehensive effort is required to increase the export share of Indonesian coffee. Evaluation of the competitiveness of industrial products in global markets uses Revealed Comparative Advantage index (Startienė & Remeikienė, 2014). Based on those points, this study aimed to analyze the competitiveness and the dynamics of competitiveness to assess the performance and position of Indonesian coffee export for the last fifteen years in international market.

Table 1. Six world major coffee producing countries in 2015/2016
Tabel 1. Enam negara produsen utama kopi dunia tahun 2015/2016

Country	Total production (ton)	Coffee type		Major production
		Robusta	Arabica	
Brazil	2.905.380	v	v	Arabica
Vietnam	1.650.000	v	v	Robusta
Colombia	840.540		v	Arabica
Indonesia	691.500	v	v	Robusta
Ethiopia	402.000		v	Arabica
India	349.980	v	v	Robusta

Source: ICO (2016a)
Sumber : ICO (2016a)

MATERIALS AND METHODS

Analysis of coffee competitiveness in this study was conducted using Revealed Comparative Advantage (RCA), while analysis of competitiveness dynamics was performed by Dynamic Revealed Comparative Advantage (DRCA). In addition, Rank Spearman Correlation was applied to measure the correlation between coffee competitor countries. The data used were time series data from 2000 to 2015 obtained from United Nations Comtrade Database (UN-Comtrade) and International Coffee Organization (ICO). Countries analyzed in this research were Vietnam, Indonesia, and India. These three countries were selected since they are the world largest Robusta coffee producers.

Comparative advantage of a country is reflected by its export which can be measured through Revealed Comparative Advantage (RCA) or known as Balassa index. Moreover, the value of RCA is $0 \leq RCA_{ij} \leq \infty$. If RCA_{ij} value is greater than unity, it means that country i has comparative advantage in coffee since the share of commodity j in total export of country i is higher than that of the same commodity in world export, thus the country specializes in the commodity. Otherwise, if RCA_{ij} is less than unity, it indicates that country i does not have comparative advantage in coffee and does not specialize in that commodity group. Formulation of RCA is presented in equation 1.

$$RCA_j = \frac{x_{ij}}{\sum_j x_{ij}} \bigg/ \frac{x_{wj}}{\sum_j x_{wj}} \quad (1)$$

Analysis of competitiveness dynamics to assess the competitiveness performance of Indonesian coffee was done using Dynamic Revealed Comparative Advantage (DRCA) referring to Edwards & Schoer (2002). DRCA is able to describe RCA along with the development over time. In addition, DRCA has the ability to determine the position of a product in the market. Formulation of DRCA can be found in equation 2. Moreover, Table 2 shows export position of a country in the international market.

$$DCRA = \frac{\Delta RCA_j}{RCA_j} = \frac{\Delta\left(\frac{x_{ij}}{\sum_j x_{ij}}\right)}{\frac{x_{ij}}{\sum_j x_{ij}}} - \frac{\Delta\left(\frac{x_{wj}}{\sum_j x_{wj}}\right)}{\frac{x_{wj}}{\sum_j x_{wj}}} \quad (2)$$

Where:

RCA_j	:	Comparative advantage of a country towards commodity j
DRCA	:	Dynamics of competitiveness
x_{ij}	:	Total export of commodity j from country i (US\$)
x_{wj}	:	Total export of commodity j from all countries (world) (US\$)
$\sum_j x_{ij}$	:	Total export of all commodities from country i (US\$)
$\sum_j x_{wj}$	:	Total export of all commodities from all countries (world) (US\$)
j	:	Commodity j
i	:	Country i
w	:	All countries (world)

RCA value obtained was used to analyze the competition level between coffee exporting countries. The analysis was performed using Rank Spearman Correlation (Lee, Lee, & Lee, 2013). The formula can be found in equation 3 and 4.

$$rs = 1 - \frac{6\sum d_i^2}{n(n^2-1)} \quad (3)$$

$$\sum d_i^2 = \sum_{i=1}^{n} [R(X_i) - R(Y_i)]^2 \quad (4)$$

Where:

r_s	:	Coefficient of correlation
R (Xi)	:	Rank for sample Xi
R (Yi)	:	Rank for sample Yi
D	:	Difference between Xi and Yi
N	:	Number of sample

Table 2. Position of export market
Tabel 2. Posisi pasar ekspor

RCA	Share of commodity j in country's export		Share of commodity j in world export	Position of export market
Increases	↑	>	↑	Rising stars
	↑	>	↓	Failing stars
	↓	>	↓	Lagging retreat
Decreases	↓	<	↑	Lost opportunity
	↓	<	↓	Leading retreat
	↑	<	↑	Lagging opportunity

Source: Edwards & Schoer (2002)
Sumber: Edwards & Schoer (2002)

According to Widodo (2010), positive value of Rank Spearman Correlation coefficient indicates competition between two countries in export market (both have similar comparative advantage pattern). Whereas, negative value means that the commodity is a complement in the product supply to export market (both have different comparative advantage pattern). It is in line with Firdaus, Harmini, & Farid (2011), which stated that if the value of $\left|rs\right| = 0$, both variables are not correlated and if the value of $\left|rs\right| = 1$, both variables are perfectly correlated. Meanwhile, higher value of $\left|rs\right|$ indicates stronger correlation between variables.

RESULT AND DISCUSSION

Overview of Indonesian Coffee

The growth of Indonesian coffee production during 1990–2015 increased by 2.11% per year which was supported by the increasing production area of 0.63% during the same period. This result led to an increase in Indonesian coffee productivity of 1.54% per year. Cultivated coffee consists of two types, namely Robusta and Arabica, of which the most cultivated in Indonesia is Robusta coffee.

Comparison of coffee production for five periods exhibited that the average production of Indonesian coffee achieved the highest production quantity during 1995–2000 (Table 3). This is because coffee plants were still in productive age, thus influencing productivity level. The average productivity level of Indonesian coffee during that period reached the highest value of 2.28% per year.

During the period 2010–2015, the average production growth, area, and productivity per year showed the lowest value. The average growth of area continued to decline and even showed negative growth due to land conversion, from coffee plants into more profitable plants cultivation. Thus, a decline in coffee production. Analysis result indicated that decreasing production area affected the level of production. During the period 2010–2015, there was also a decline in national coffee production of 0.32% per year along with the decreasing production area, due to the aging coffee plants (more than 25 years). Based on those findings, plant rejuvenation and production area extensification in order to boost national coffee production is required.

National coffee productivity in 1990 reached 385.82 kg/ha, lower than it was in 2015 which reached 538.80 kg/ha in. Despite the trend of an increase in coffee productivity and achieving a growth of 1.54% per year during 1990–2015, its growth was still relatively low compared to Vietnam. Before 1998, Indonesia was the largest Robusta coffee exporter in the world. However, from then on Vietnam has been in the position until now with the productivity level at 2.5 ton/ha.

National coffee production is intended to meet domestic demand and to be exported to consuming countries. Of which, export of Indonesian coffee in 2015 reached 479.100 tonnes (ICO, 2016b). Most of coffee exported was in the form of coffee beans (99.5%), whereas only 0.5% processed (roasted and powder) (Direktorat Jenderal Perkebunan, 2015). Based on coffee type, most exported was Robusta (76.7%), while the rest was Arabica (Kementerian Perindustrian, 2015). For the last fifteen years, Indonesia experienced major shift of export destination countries. In 2005, the major export destination markets of coffee were USA, Europe, and East Asia. In 2015, market share of export destination to USA and Europe tended to decrease despite an increase in coffee export to Russia by 40% compared to 2014 (UN Comtrade, 2017).

Table 3. Average growth of production, area, and productivity of Indonesian coffee
Tabel 3. Rata-rata pertumbuhan produksi, luas areal, dan produktivitas kopi Indonesia

Year	Average growth/year (%)		
	Production	Area	Productivity
1990–1995	2.24	2.02	0.23
1995–2000	3.84	1.79	2.28
2000–2005	3.42	1.97	1.55
2005–2010	1.04	-1.19	2.27
2010–2015	-0.32	-0.42	0.16

Source: BPS (2016)
Sumber : BPS (2016)

Declining market share in USA and Europe was due to increasing competition among major exporting countries, especially coffee demand from countries which are known to be selective on quality. The segmentation of quality coffee are high end, middle range, and low range (Simamora, 2014). Export destination market of Indonesian coffee continues to shift and tends to increase in 2015 in Asian countries such as Malaysia, Thailand, and India, as shown in Figure 1.

Most of coffee exported from Indonesia is Robusta coffee beans. Indonesia is facing Robusta coffee export competition particularly from Vietnam and India. Analysis result showed that the competitiveness of Indonesian coffee during 2000–2015 was fluctuated with a tendency to increase. It can be seen from RCA value per year with an average growth of 0.69 (Figure 3). Although the export quantity decreased during the period 2011–2015, there was an increase (0.64%) in the average of Indonesian coffee export share in all Indonesian export commodities. In general, for the last fifteen years (2000–2015), the average growth of Indonesian coffee export share in all Indonesian export commodities increased 5.43% each year.

According to analysis result, Indonesian coffee commodity has comparative advantage since Indonesia has higher export market share in international market. This can be seen from the greater of RCA value than unity. The average RCA value of Indonesian coffee during 2000–2015 was 5.61. In 2015, Indonesian coffee export market share in the world was only 6.5%, which was still far below from the main competitor, namely Vietnam that reached 12.8%.

Competitiveness of Vietnamese coffee was found to be the highest compared with other major competitor countries. This is supported by the availability of Vietnamese coffee supply to meet the world market demand. However, the development of RCA value of Vietnamese coffee decreased by 55.4%, thus impacting the competitiveness of Vietnamese coffee in the world coffee market. The decline was due to the proportion of coffee export which was smaller than the total export of commodities. The average RCA value of Vietnamese coffee during 2000–2015 was 27.3 with the lowest RCA value of 12.68 in 2015. The other major competitor of Indonesian coffee was India. India mostly exported Robusta coffee in the form of coffee beans. The analysis result indicated that the development of Indian coffee competitiveness decreased by 46.9% due to the decreasing of coffee export.

Based on this result, the comparison of competitiveness among three countries can be seen in Figure 2. Competitiveness of Indonesian coffee tended to increase compared to the two major competitors of Robusta coffee exporter, namely Vietnam and India. However, the competitiveness level of Indonesian coffee was still half of Vietnamese coffee. A decline in Vietnamese coffee competitiveness is an opportunity for Indonesia with the consequence of having to increase coffee productivity and quality to meet the demand of world consumer.
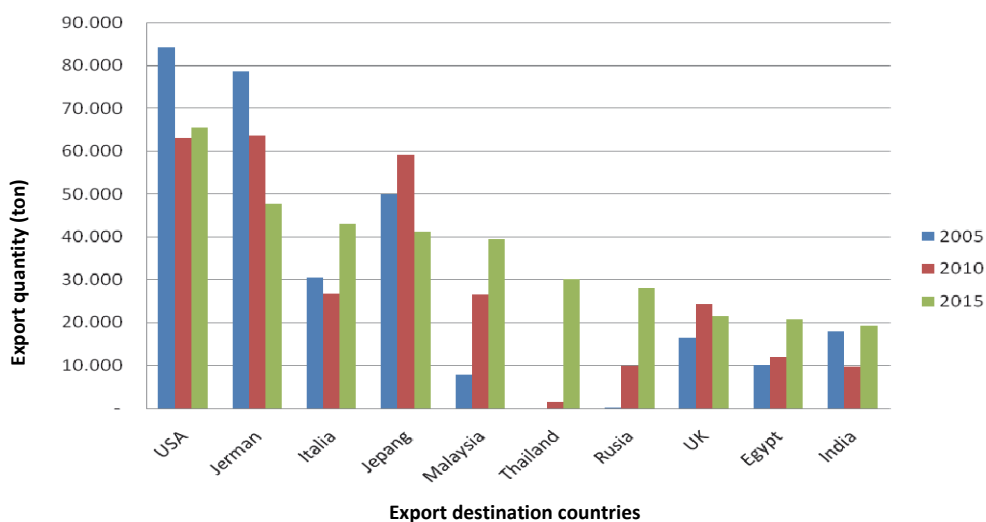

Figure 1. Shift of major export destination countries of Indonesian coffee (Source: UN Comtrade, 2017)
Gambar 1. Pergeseran negara-negara tujuan ekspor utama kopi Indonesia (Sumber: UN Comtrade, 2017)
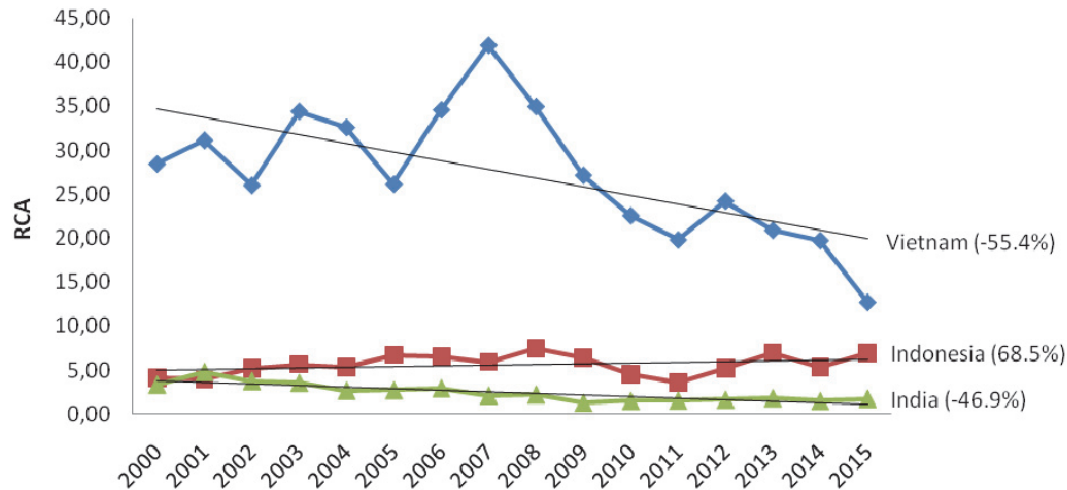
Figure 2.   Development of RCA value of Indonesian coffee with major competitor countries (Source: UN Comtrade, 2017, processed)

Gambar 2.   Perkembangan nilai RCA kopi Indonesia dengan negara pesaing utama (Sumber: UN Comtrade, 2017, diolah)

Analysis of Dynamics and Correlation of Indonesian Coffee Competitiveness with Major Competitor Countries

Indonesia as the second largest exporter of Robusta coffee worldwide during 2000–2015 experienced changes in competitiveness performance. The changes were in line with the development over time which showed the shift of Indonesian coffee position in the market, particularly from the major competitor countries of Indonesian Robusta coffee such as Vietnam and India.

Analysis result showed that the dynamic RCA (DRCA) value of Indonesian coffee increased in three periods of time (Table 4). In comparison with Vietnam as the leading exporter of Robusta coffee in the world, DRCA value of Indonesia increased and showed a positive value by the end of the year. This is indicated by the fluctuating RCA value along with the increasing trend. The RCA values in 2000, 2005, 2010, and 2015 were 4.12, 6.74, 4.56, and 6.94, respectively. In that period, RCA value of Indonesian coffee shown a

decrease only in 2010. This is due to the declining export share of coffee resulted from decreasing value of Indonesian coffee export in that year which was 1.17% from the previous year. Furthermore, in the period 2010–2015, the growth of Indonesian coffee export share tended to increase despite the value of Indonesian coffee export had a tendency to fluctuate during that period of time.

Vietnam as the major competitor of Indonesian coffee and the largest exporter of Robusta coffee worldwide experienced declining competitiveness performance. This is indicated by the decreasing RCA values in three periods of time, i.e. in 2000 (28.40), 2005 (26.10), 2010 (22.54), and 2015 (12.68). Declining in RCA value was due to the decreasing export value of Vietnamese coffee in the value of export commodity of all commodities in that country. Although the export value of Vietnamese coffee tended to increase every year, the growth of export value of all commodities in that country was higher than the export value of Vietnamese coffee.

Table 4. Value of dynamic RCA (DRCA) of 2000-2015

Tabel 4. Nilai RCA dinamis (DRCA) tahun 2000-2015

Country	Period of time		
	2000—2005	2005—2010	2010—2015
Indonesia	0.450	-0.423	0.527
Vietnam	-0.057	-0.179	-0.441
India	-0.131	-0.577	0.166

Source: UN Comtrade, (2017), processed

Sumber: UN Comtrade (2017), diolah

Another major competitor of Robusta coffee is India which experienced an increase in export competitiveness performance as shown by DRCA values that tended to increase over the three periods of time. During the period 2010–2015, competitiveness of Indian coffee was at the highest competitiveness performance compared to the other two periods of time. However, market share of Indian coffee in the international market only reached 2.9% in 2015.

Competitiveness position of the major exporting countries of coffee can be seen in Figure 3. Vietnam as the leading exporter of Robusta coffee in the world experienced decreasing competitiveness position in the world market of coffee. During the period 2000–2005, Vietnam was in a lagging position in which the decrease in growth rate of Vietnamese coffee share was higher than the decrease in the share of world coffee. During the period 2005–2010, the growth of Vietnamese coffee market share was better than the

previous period. Vietnam was in a lagging opportunity position where the increase in coffee export share was lower than the increase in world coffee share. In the period 2010–2015, the growth of Vietnamese coffee share experienced a decline in which the world coffee share increased during the same period. At that time, Vietnam was at the lost opportunity position since increasing demand for world coffee did not equal with the ability to supply coffee to the global market.

The position of Indonesia in the world coffee market was different from that of the major competitor, namely Vietnam. During the period 2000–2005, Indonesia experienced falling stars where the growth of RCA value reflected by Indonesian coffee export share was higher than the growth of world RCA value. In that condition, the share of world coffee decreased by 29.3% due to the fact that the growth of export value of all world commodities was higher than the growth of world coffee export value.
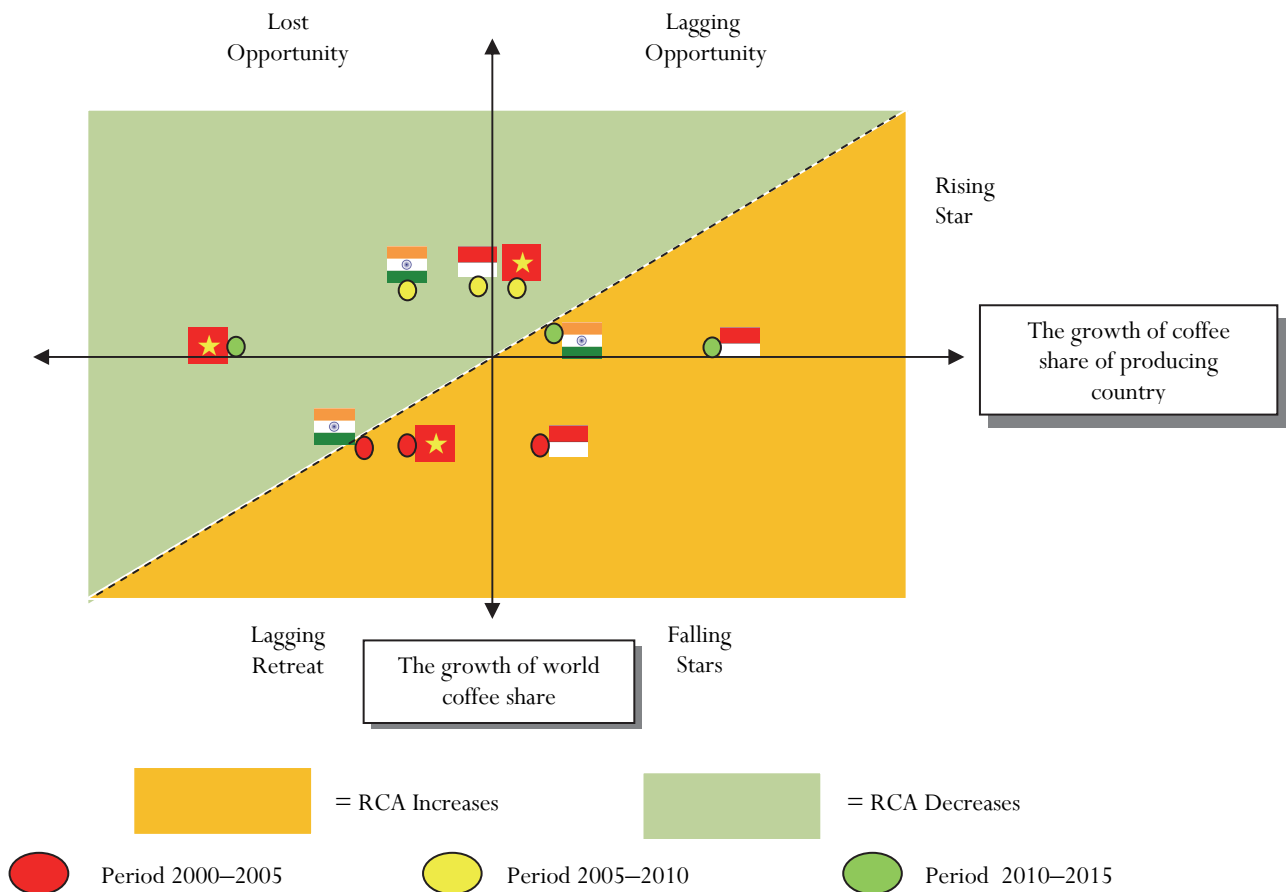

Figure 3. Competitiveness position of Indonesian coffee and major competitor countries
Gambar 3. Posisi daya saing kopi Indonesia dengan negara pesaing utama

Unlike the condition during the period 2005–2010, Indonesia was in a lost opportunity position due to decreasing growth of RCA value of Indonesian coffee, while the RCA value experienced positive growth. In this situation, the share of Indonesian coffee export in all commodities exported by Indonesia decreased by 11.4%. Nevertheless, Indonesia was in a rising star position during the period 2010–2015 as the growth of Indonesian coffee export share was higher than the growth of world coffee export share. Yet, the market share of Indonesian coffee in the international market in 2015 was still relatively low (6.5%) compared to Vietnam (12.8%). During that time, market share of Indonesian coffee towards other export commodities increased by 34.9%. This result was due to two reasons, namely: a) increasing export value of coffee by 46.4% during 2010–2015, and b) declining export value of all Indonesian export commodities by 4.7%. Indonesia is able to improve its coffee competitiveness in the international market when this country consistently increases the quantity of coffee export. Furthermore, effort to improve the quality of exported coffee can increase the coffee competitiveness in the international market.

The strength of competition among major competitor countries was seen based on the correlation value between two countries by using Rank Spearman Correlation analysis. Correlation between the countries can be seen in Table 5. Analysis result showed that Indonesia was not significantly correlated with major competitor countries such as Vietnam and India. This is indicated by the p-value which was higher than the significance level (0.05). This finding was in accordance with the study conducted by Meiri, Nurmalina, & Rifin (2013) that Indonesia did not have significant correlation with Vietnam due to the difference of coffee markets during 2000–2011. In 2015, Indonesian coffee market dominated North Africa and Southeast Asia, while Vietnam dominated American and European market. Moreover, Indonesia was not significantly correlated with India due to the difference in export destination countries. Nevertheless, the comparison between Indonesia-Vietnam and Indonesia-India showed that p value of Indonesia-India is larger than Indonesia-Vietnam. This is because RCA growth of Vietnam coffee (-55.4%) lower than that of Indian coffee (- 46.9%) over the last fifteen years.

Another analysis result showed that there was a positive and significant correlation (0.529) between Vietnam and India as indicated by p-value (0.035) which was lower than the significance level (0.05). The existence of the same destination market showed that there was competition between Vietnam and India. However, as India's market share was still much lower than Vietnam, competition between the two countries was not very strong.

Table 5. Correlation of competitiveness among coffee exporting countries
Tabel 5. Korelasi daya saing antar negara eksportir kopi

Correlation	Indonesia	Vietnam	India
Indonesia	1.000	0.153	-0.121
Vietnam	-	1.000	0.529*
India	-	-	1.000

Notes   : * significant at 5 % level
*Keterangan : * nyata pada taraf 5%*

CONCLUSION

Competitiveness of Indonesian coffee during the period 2000–2015 tended to increase compared to the two major competitors of Robusta coffee exporters, namely Vietnam and India. Furthermore, the growth of Indonesian coffee export share in all Indonesian exported commodities tended to increase. Whereas the major competitor country of Indonesian coffee, namely Vietnam experienced declining competitiveness performance as shown by the decreasing value of RCA and DRCA. Nevertheless, the level of Indonesian coffee competitiveness was still half of Vietnam. During the period 2010–2015, the growth of Vietnamese coffee share decreased in which period the share of world coffee increased. Vietnam was in a lost opportunity position since the increasing demand for world coffee did not equal the ability to supply coffee to the global market. At the same period, Indonesia was in a rising star position as the growth of Indonesian coffee export share was higher than the growth of the share of world coffee export. The share of Indonesian coffee market in export commodities tended to increase due to the increasing export value of coffee and the decreasing export value of all Indonesian export commodities. Despite Vietnam and India are two of the leading producers of Robusta coffee worldwide, competition strength between the two countries and Indonesia was not significantly correlated. This result was due to the market difference of export destination countries. Increasing Indonesian coffee competitiveness can be achieved by increasing the productivity through coffee plantation rejuvenation. Furthermore, postharvest processing of coffee beans can also be used to increase product quality and export. In addition, creating new coffee market, not only in Europe but also in West Asia and America is necessary.

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