Article Type: Research Paper

Determining Competitiveness of Indonesian Export Commodities using Revealed Comparative Analysis

Suparmono[1]*, Edi Suandana[2], and Fauzan Ilmas[2]

Abstract: This article aims to analyze Indonesian products' competitiveness in the global market using the static revealed comparative advantage (SRCA) and the dynamic revealed comparative advantage (DRCA). DRCA is considered superior to RCA because it takes into account the time element. The current research combines DRCA and RCA to provide an analytical comparison. The data were collected from the International Trade Centre, classified according to the Harmonized System (HS) from 2013 to 2019. Using SRCA, Indonesia's tin and articles' competitiveness only contributes 0.95% of Indonesia's total exports. The most significant shares of exports are mineral fuels, mineral oils, and their distillation products; bituminous substances; animal or vegetable fats and oils, and their cleavage products; and prepared edible fats. Using DRCA, Indonesia's most significant exports in the rising star category are natural rubber and its derivatives; cars and other motorized vehicles; fatty acids and their derivatives; lignite; unforged lead; ferroalloys; wires and cables; refined copper; petroleum and minerals; and margarine and its derivatives. These products showed positive growth higher than the global average, which means Indonesia is competitive in exporting these products. Thus, the government could prioritize these products for export.
Keywords: Competitiveness; Static RCA; Dynamic RCA; Trade Specialization; Commodities
JEL Classification: F12; F14; B27

Introduction

Indonesia's export products' competitiveness has been declining in the past decades; for example, non-oil and gas exports declined by 15.38 percent from 2011 to 2019, with the most significant drop being 16% in 2018 (Khaliqi, Gurning, Novanda, & Simamora, 2020). Meanwhile, primary products from logging, low-technology manufacturing and processing become key commodities. These products dominate the market but they have little added value. Likewise, agricultural products are predominant but have low added value compared to non-agricultural products. Therefore, increasing competitiveness is important for improving the trade balance's performance and global development ranking (Erkan & Aybudak, 2019).

Competitiveness, in general, is the capacity to manufacture goods and services that satisfy the foreign market's criteria and offer increased and long-term quality of life (Bernardini Papalia, Calia, & Filippucci, 2014). While product-level comparative advantage in aggregated trade flows in a general theoretical framework, trade costs are estimated using pooled product-level trade data (French, 2017) (Shahzad, 2015). Macro-economic variables, such as inflation, unemployment, interest rate, tax rate, and economic growth rate, are important in enabling a country to compete in today's global market. However, these variables alone will not suffice (Łapińska, Huterska, Zdunek-Rosa, & Huterski, 2020) because competitiveness is not only about the quantity but also the density-dependent factors of the exported product (Ćorović, Gligorijević, & Manasijević, 2019).

This study aims to determine Indonesian products that are competitive in international trade using the revealed comparative advantage (SRCA) and dynamic revealed comparative advantage (DRCA) approaches. RCA analysis can accurately describe product competitiveness in the international market (Shahzad, 2015). Past research has examined competitiveness using one of the two approaches (Khaliqi et al., 2020). For example, the RCA approach (Qiao & Ma, 2015) predicts the competitiveness of Chinese products in the global market, revealing a significant shift in competitiveness from time to time. In Indonesia, another empirical study shows that from 2015 to 2019, the competitiveness of Indonesia's export products consisted of five main food and beverage products (Abdullah & Rosjadi, 2021). Meanwhile, the average RCA of livestock, light and heavy industrial products had low competitiveness. Another study uses RCA combined with other variables, i.e., price, GDP, the number of workers, and capital (Liew, Arip, & Puah, 2021). The result indicates a short-run dynamic impact on competitiveness from these variables. To increase competitiveness, the study suggests intensifying economic policies by focusing on downstream products and taking advantage of the comparative advantage in the upstream industries.

Product competitiveness in international trade can also be determined by using a combination of Revealed Comparative Profit (RCA), Relative Export Advantage (RXA), Relative Import Advantage (RMA), Relative Trade Advantage (RTA), and Relative Competitiveness Index (RC). The result shows that competitiveness is highly responsive to economic crises and local currency exchange rates (Erdem, 2020). A combination of the RCA and Trade Specialization Index approach (TSI) has also been used to assess the competitiveness of Indonesian rubber products in the global market (Daulika, Peng, & Hanani, 2020). The results indicate that the factors affecting Indonesian natural rubber exports prices are international rubber prices, exchange rates, and domestic consumption. The RCA analysis shows that Indonesia's natural rubber exports are highly competitive in the international market.

A major advantage of using the RCA index is that it can determine competitiveness by country, product, and period. For example, combined with the index of Contribution to the Trade Balance (CTB), RCA can reveal a country's strengths and weaknesses compared to other countries (Laursen, 2015) (Granabetter, 2016) (Bioeconomy Malaysia Report, 2015) (Shahzad, 2015) (Stellian & Danna-Buitrago, 2019) (Safi et al, 2022). However, the existing research analyzes competitiveness mostly using one RCA tool, although

considering some factors in macroeconomic indicators such as global and national economic policies (Caliendo, Dvorkin, & Parro, 2019). To extend the existing body of research, the current study combines static RCA and dynamic RCA (DRCA) to examine Indonesian goods' competitiveness in the international market. In addition, all groups of goods in the HS index are analyzed to reveal the export competitiveness. The findings are expected to inform the government in developing export strategies, e.g., prioritizing superior products identified in this study. Likewise, for business actors, the findings in this study can provide direction and an overview of competitive products to be exported.

Competitiveness definition is more complex than the various meanings often used to describe the circumstances. Competitiveness, in general, is the capacity to manufacture goods and services that satisfy the foreign market's criteria and offer increased and long-term quality of life (Bernardini Papalia et al., 2014). Meanwhile, revealed comparative advantage is a key concept in international economics. It determines trade flows, so we can use trade flows to compute an index that reveals comparative advantages (Stellian & Danna-Buitrago, 2019).

Export Product Dynamic (EPD) is not as robust as RCA because it can only determine the position of a commodity in a certain destination market. This position is not effective in determining the competitiveness of a country's products. Even if the analysis is combined with the ordinary least squares method (OLS), the results will only affect other variables, such as GDP per capita, export prices, and the real exchange rate of the destination country (Fauziah, Riniati, & Wibisono, 2021).

Another approach used to determine competitiveness is Relative Export Advantage (RXA), which is complimentary to RCA. The analysis can cover a group of countries and many manufacturing industries. In other words, this approach will result in a more general competitive advantage mapping, unlike the specific result generated by RCA (Stellian & Danna-Buitrago, 2019). Meanwhile, Constant Market Share (CMS) is considered a widely used index due to its ease of use and intuitiveness (Cinquetti, 2018). This model links export growth to structural strength or competitiveness. However, it is only relevant to the domestic competitiveness structure, which could be biased when compared to other countries (Aguiar et al., 2017).

Competitiveness in international trade can also be measured by the Trade Intensity Index (TII), which describes the bilateral trade against total international trade. TII can also show trade intensity, referred to as the intra and extra trade. This index is used to measure whether a trade value between two countries is higher (or smaller) than expected, based on the importance of the world trade. An index value higher than 1 indicates an intense trade level between the exporting country and the partner country compared to their trade with the rest of the world (Constantinescu & Panagoret, 2017). Nevertheless, this approach can only measure competitiveness between two countries, so it is not comprehensive (Khaliqi, Gurning, Novanda, & Simamora, 2020) (Benalywa, Ismail, Shamsudin, & Yusop, 2019).

Overall, it could be concluded that the RCA method is more robust than other approaches—such as Export Product Dynamic (EPD), Relative Export Advantage (RXA), Constant Market Share (CMS), and Trade Intensity Index (TII)—to measure product competitiveness in the international trade. Additionally, using a dynamic approach will capture not only the types of products gaining competitiveness in the international market but also the map of product competitiveness.

Indonesia's competitiveness index reached 4.68 in 2017/2018, which increased from 4.51 in 2016/2017. The decline in the competitiveness index occurred in 2014-2016. The competitiveness ranking then recovered in 2016/2017, increasing from rank 41 to rank 36 globally. In the same year, India declined from rank 39 to rank 40 and Singapore from rank 2 to rank 3.

In 2010-2019, the Indonesian national economy grew by 5.39% per year. This growth rate is high considering the stagnant regional and global economies. On a regional level, using the 2010-2019 constant price GRDP data in that period, Central Sulawesi Province showed the highest average economic growth of 9.48% per year. Meanwhile, East Kalimantan Province showed the lowest average economic growth, only 2.41% per year. Using geometric average, all provinces' average economic growth reached 5.50%. The economic growth in the provinces can be seen in Figure 1.
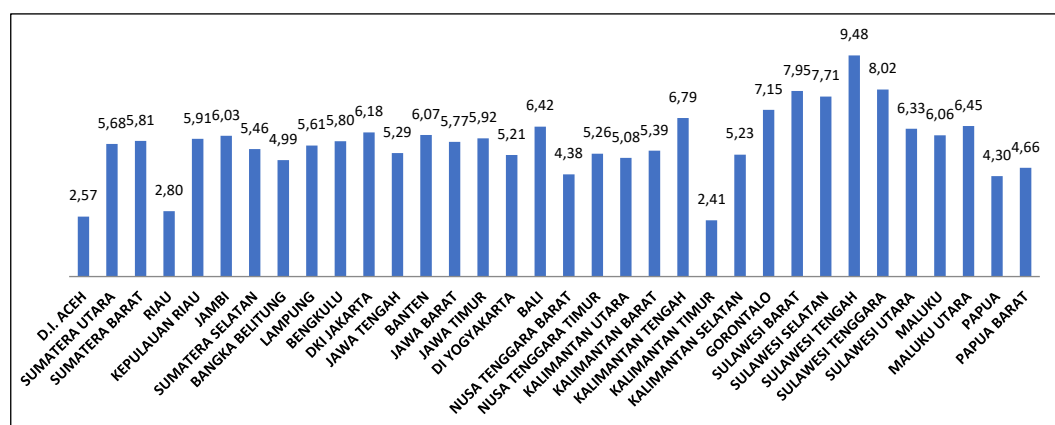

Figure 1 Comparison of Average Economic Growth 2010-2019 Inter-Provinces in Indonesia

Comparison between provinces can be shown through the economic sectoral competitiveness review using LQ, which indicates that the values of the agriculture, forestry, and fisheries sectors in almost all provinces were > 1. Out of 34 provinces, only nine provinces show LQ scores < 1. The highest value for these sectors was shown by West Sulawesi, at 3.0799. This implies West Sulawesi's output was higher than the national average and has great potential to be exported.

Nevertheless, judging from the value of the Global Value Chain (GVC) in 2019, Indonesia's participation in the global chain was still low, at 43.5—below the average developing countries' participation, at 48.5. Malaysia's index was considerably higher, reaching 60.8, followed by Thailand (54.3) and China (47.7). This index indicates a country's involvement

in the production of goods. The production value chain involves many other countries, including design and development, raw material input, selection and assembly, physical transformation and processing, acquisition of required services such as transportation and financing, and responses to consumer demand. The value of the Global Value Chain (GVC) in 2019 can be seen in Figure 2.

Indonesia's participation in the VGC is the most significant in the mining industry, wholesale and retail trade, and agriculture, with three major recipient countries of the input goods being China, South Korea, and Malaysia. Indonesia's main production is intermediate goods, rebought after becoming finished goods. The low level of Indonesia's participation in the VGC is because the country is still dependent on agricultural and mining product exports, which do not provide significant added value. Besides, the manufacturers of general items, which call for low-cost labor, mostly take place in low-wage countries, including China, Indonesia, India, Vietnam, and Korea. The added value of this process is low, lagging behind advanced nations—such as Italy, Germany, and Japan—which produce high value-added and high-end products (Son, 2014).
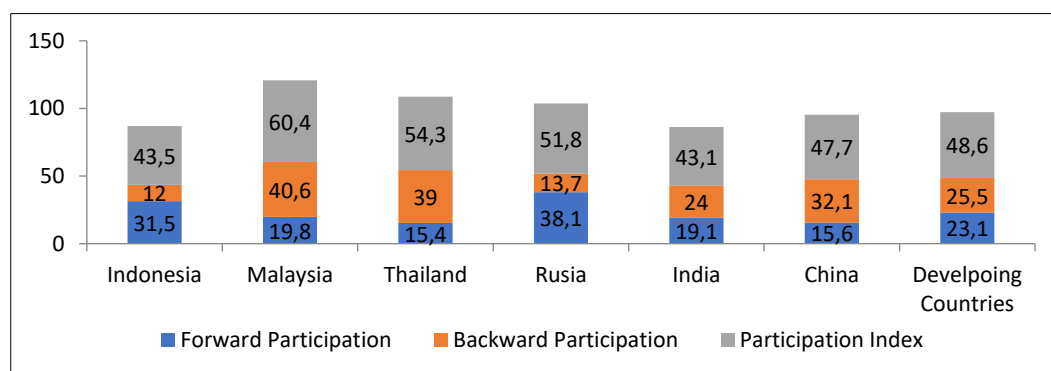

Figure 2 Indonesia's GVC compared to Several Countries

Research Method

This study uses secondary data obtained from the World Trade Organization (2019) and the International Trade Center (2019). The data consist of annual time series trade data of Indonesian products from 2013 to 2019. The data processing uses static and dynamic Revealed Comparative Advantage (RCA). Calculating the competitiveness of Indonesian export products is done by comparing the share of domestic and export destination countries. This is important so that the government's strategies can focus on highly competitive products. The data's timeframe is limited to 2019 to avoid the influence of the COVID-19 pandemic on the Indonesian and the global economies, whose landscapes have been reshaped since 2020.

Past studies have highlighted the determinants of export competitiveness by calculating comparative advantage using the RCA Balassa index (Irsahd & Xin, 2017). The RCA indices use the trade trend to classify industries with a competitive advantage by contrasting the

trading profile of the country of interest with the world average (Hossain, Dechun, Zhang, & Van, 2017). Following the previous studies, this study looks at the profitability of exports using the Balassa index (Balassa, 1965), developed by Balassa, who also established Liesner 's principle (1958). The index measures comparative export advantages based on the Ricardian exchange theory, using the following equation (Falkowski, 2017):

$$RCAij = \left(\frac{Xij}{Xit}\right) / \left(\frac{Xnj}{Xnt}\right)$$

where X reflects the export flows from a given country j, of a given sector or commodity i; t is a product group, and n is a country group. A recorded export comparative advantage (or disadvantage) index is calculated by comparing the export share of total export globally with the export share of a comparable category from the total exports in the country group (Łapińska et al., 2020). The RCA index's interpretation is straightforward (Obadi, 2016). If the index value is greater than 1, the country has a disclosed competitive advantage, i.e., fairly skilled in producing and selling the commodity. Suppose the value is 0 < RCA <1, the country has a comparative disadvantage (Oelgemöller, 2013). Established competition exchange metrics such as the RCA index and the published competition index (RC) show the international competitiveness of the industries being evaluated (Figiel & Kufel, 2013).

Meanwhile, Dynamic Revealed Comparative Advantage (DRCA) measures the dynamic analysis of RCA's changes by separating the factors causing its growth (Hossain et al., 2017). The advantage of DRCA is that it can identify product advantages over time and explain product position in the export destination market. This is done by categorizing each product based on its position in the destination market. Therefore, the DRCA can better explain changes in competitiveness than RCA in general, especially to identify what products are experiencing an increase or loss of market share. In other words, DRCA can provide policy recommendations for products by considering the export market conditions. Essentially, a product that experiences an increase in RCA value is not necessarily categorized as a product with good export performance and vice versa. There is a typically balanced relationship in bilateral trade. A particular industry and year can be decomposed into 1) an export-fixed effect industry, which measures the country's export potential in the industry; 2) a fixed importer-industry effect, which captures the effective demand of the importing country for foreign goods in the industry; 3) an exporter-importer portion, which accounts for bilateral trade frictions (Hanson, Lind, & Muendler, 2016).

$$DRCA_j = \frac{\Delta RCA_j}{RCA_j} = \frac{\Delta\left(\frac{X_{i,j}}{\sum_j X_{i,j}}\right)}{\frac{X_{i,j}}{\sum_j X_{i,j}}} - \frac{\Delta\left(\frac{X_{m,j}}{\sum_j X_{m,j}}\right)}{\frac{X_{m,j}}{\sum_j X_{m,j}}}$$

Xi, j = export of commodity j from the country i to the destination market (region or world); Xm, j = export of commodity j from the region or the world to the destination market. Suppose the RCA value increases due to an increase in the origin country's export

share, which is higher than that of the destination country. In that case, the commodity is considered a rising star. Conversely, suppose the export share in the origin countries rises not as much as the market share's rise in the destination countries. In that case, the RCA value will decrease, and the commodity is considered unable to take advantage of the increase in market size (Siggel, 2006). A product with an increased RCA value may be considered a 'falling star' if the increase in RCA is only due to a decrease in the destination's market share, which equals the downsizing of the overall market share. The Position of Export Competitiveness in RCA is shown in Figure 3.
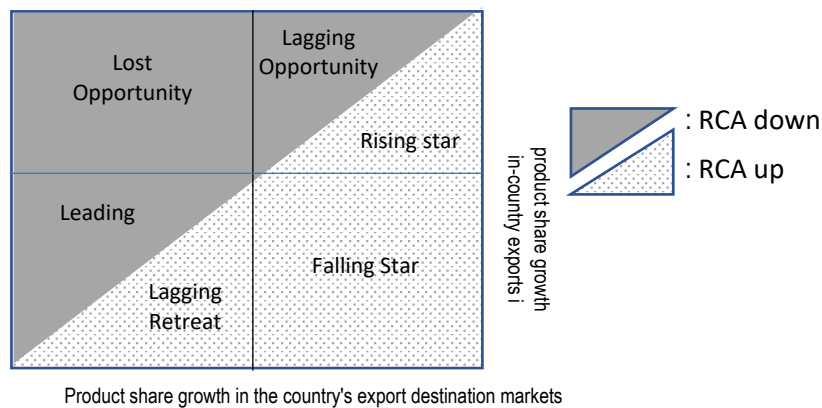

Figure 3 The Position of Export Competitiveness in RCA

Result and Discussion

Based on the static Revealed Comparative Advantage (RCA), the competitiveness level of Indonesian export, from HS2, 30 groups of goods out of 99 groups had a value of > 1. The first rank with the highest RCA value in 2013-2019 was the tin and articles' group (coded HS79). The high value indicates that Indonesian exports to the world were highly competitive. Indonesia can dominate the world market for goods of the same type. The competitiveness of these goods increased slightly to 28.14 in 2017 from 27.52 in 2013.

Indonesia's export competitiveness in 2017 was animal/vegetable fats and oils worth US$ 8,373.2 million. The year-on-year (y-o-y) comparison shows that there was a decrease in exports of animal/vegetable fats and oils by 15.66% from the previous value of US$ 9,928 million. Animal/vegetable fats and oils is one of the top ten ASEAN leading export commodities (Astrini & Azzakiyyah, 2018). Meanwhile, the exports performance of rubber and its processed products in 2021 grew by around 5.0% y-o-y, in line with the projected increase in world oil prices. This increase reflects a rebound in demand from major world countries other than China, which previously plunged. In addition, rubber commodities were also expected to receive a positive sentiment from oil prices as the OPEC+ members were committed to maintaining their prices by reducing supply until at least the first half of 2021 (Indonesia Exim Bank, 2021).

In 2013-2019, nine out of the 30 groups of goods showed a decrease in competitiveness, even though the decline was minimal. The most significant decrease occurred in the group of ores, slags, and ashes (coded HS26), equal to -1.12. Meanwhile, competitiveness increased most significantly in vegetable plaiting materials and products not elsewhere specified or included, with a value of 11.02. In the second place was the group of animal/vegetable fats and oils and their cleavage products and prepared edible fats, with an increase of 3.95. Exported Goods Group with RCA> 1 is shown in Table 1.

Table 1 Exported Goods Group with RCA> 1

No	Product Label	2013	2019	+/-
1	Tin and articles thereof	27.52	28.14	0.62
2	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal	20.14	24.10	3.95
3	Musical instruments; parts and accessories of such articles	8.49	9.11	0.62
4	Vegetable plaiting materials; vegetable products not elsewhere specified or included	4.64	15.67	11.02
5	Man-made staple fibers	5.87	5.94	0.07
6	Prepared feathers and down and articles made of feathers or down; artificial flowers; articles	3.98	5.63	1.65
7	The pulp of wood or other fibrous cellulosic material; recovered (waste and scrap) paper	4.13	5.27	1.14
8	Coffee, tea, maté, and spices	4.48	3.93	-0.55
9	Rubber and articles thereof	4.69	4.36	-0.32
10	Footwear, gaiters, and the like; parts of such articles	3.10	3.56	0.45
11	Nickel and articles thereof	3.36	3.33	-0.02
12	Manufactures of straw, of esparto, or other plaiting materials; basketware and wickerwork	3.40	3.21	-0.18
13	Wood and articles of wood; wood charcoal	2.89	3.05	0.16
14	Fish and crustaceans, mollusks, and other aquatic invertebrates	2.82	2.85	0.03
15	Cocoa and cocoa preparations	2.72	2.37	-0.35
16	Tobacco and manufactured tobacco substitutes	2.12	2.84	0.71
17	Man-made filaments; strips, and the like of man-made textile materials	2.59	2.11	-0.47
18	Paper and paperboard; articles of paper pulp, paper, or paperboard	2.26	2.44	0.18
19	Preparations of meat, fish or crustaceans, mollusks, or other aquatic invertebrates	2.05	1.99	-0.05
20	Miscellaneous chemical products	2.14	2.14	0.00
21	Mineral fuels, mineral oils, and products of their distillation; bituminous substances; mineral	1.80	1.96	0.15
22	Articles of apparel and clothing accessories, not knitted or crocheted	1.94	1.89	-0.05
23	Ores, slag, and ash	2.74	1.51	-1.22
24	Soap, organic surface-active agents, washing preparations, lubricating preparations, artificial	1.87	1.88	0.00
25	Articles of apparel and clothing accessories, knitted or crocheted	1.56	1.72	0.15
26	Cotton	1.19	1.51	0.32
27	Miscellaneous edible preparations	1.09	1.54	0.45
28	Copper and articles thereof	1.08	1.46	0.37
29	Preparations of cereals, flour, starch, or milk; pastrycooks' products	1.03	1.43	0.40
30	Lac; gums, resins, and other vegetable saps and extracts	0.96	1.38	0.41

Based on these static RCA measurements, many Indonesian products could be considered highly competitive in the international market. However, the use of high technology in export-oriented goods remains low. The tin and articles group thereof in 2018 turned out to only contribute to the export value of 0.95% of Indonesia's total exports. The most significant share of exports was the group of mineral fuels, mineral oils, and products of their distillation, bituminous substances, and minerals, with the value of 21.84%, followed by the group of animal/vegetable fats and oils and their cleavage products, prepared edible fats, and animals, at 13.60%. Both of these groups showed an RCA value of > 1.

Goods with a reasonably large export share but having an RCA below 1 were those in the group of electrical machinery and equipment, sound recorders and reproducers, and television at 5.01%, but the RCA value was only 0.34 in 2017. This indicates that electrical machinery products were in tight competition in the international market. The group of fish and crustaceans, mollusks, and other aquatic invertebrates remained stable during the pandemic, as fish remained a healthy diet option. In addition, Indonesia benefited from the US and Europe markets China could not enter at the beginning of the year because of the import bans. Fishery export performance in 2019 grew by 3.9% y-o-y, increasing by 17.0% y-o-y in the third quarter. Exports of fish and crustaceans, mollusks, and other aquatic invertebrates were projected to decrease in the fourth quarter of 2020 due to the based-effect of the fourth quarter of 2019. However, the actual performance every quarter showed an increase. In 2021, fisheries exports were still highly prospective, and Indonesia found its niche market in the US, European and Japanese markets (Indonesia Exim Bank, 2021).

Based on the dynamic RCA level of Indonesian export using more detailed HS4 standards, 10 out of 30 commodity groups with the most significant export value could be categorized as the rising star commodities, namely HS 4001 (natural rubber and its derivatives), HS 8703 (cars and other motorized vehicles), HS 3823 (fatty acids and their derivatives for the industry), HS 2702 (lignite), HS 8001 (unforged lead), HS 7202 (ferroalloys), HS 8544 (wire, cable, and the like), HS 7403 (refined copper), HS 2710 (petroleum oils and mineral oils), and HS 1517 (margarine and its derivatives). This indicates that in 2015-2019, these products showed positive growth both in Indonesia and internationally, but growth in Indonesia was higher than the growth of similar products globally. These goods improved the share of world exports in 2015-2019.

Also, there are products in the 'falling star' category, such as HS 4703, HS 4802, and HS 7108. This indicates that although Indonesia's export in 2015-2017 increased, the world growth in these products decreased. As for the 'lost opportunity' category, four types of products in the HS 2709, HS 2603, HS8708, and HS 0901 groups showed that Indonesia could not respond optimally to the export demand for these products. This is despite the fact that exports of these products increased globally, prompted by internal or external factors. In other words, the country needs to revisit its market share strategies and reduce its dependence on certain destination countries. Future studies can look into this area in more depth.

Table 2 Commodity Plotting Based on Competitiveness Group

Year	Rising Star	Falling Star	Lagging Retreat	Lost Opportunity	Leading Retreat	Lagging Opportunity
2014	02, 03, 05, 06, 07, 08, 14, 19, 20, 21, 22, 23, 24, 30, 32, 33, 38, 39, 44, 45, 46, 48, 53, 54, 55, 56, 58, 59, 64, 66, 69, 72, 73, 75, 78, 81, 83, 84, 87, 90, 92,96, 99	10, 12, 13, 15, 16, 17, 28, 29, 37, 50, 52, 70, 71, 74, 93		01, 04, 09, 11, 25, 34, 36, 41, 42, 47, 49, 76, 80, 82, 85, 86, 88, 91, 95, 97	26, 27, 31, 40, 43, 51, 89	18, 35, 57, 60, 61, 62, 63, 65, 67, 68, 79, 94
2015	07, 08, 09, 14, 15, 18, 19, 20, 21, 22, 24, 25, 28, 30, 32, 33, 35, 42, 43, 44, 46, 47, 48, 52, 53, 55, 56, 57, 58, 59, 60, 61, 62, 64, 65, 67, 68, 70, 71, 73, 78, 79, 81, 82, 86, 87, 88, 92, 96, 99	02, 05, 06, 10, 13, 26, 49, 72	27, 36, 41, 80	11, 12, 16, 31, 37, 38, 39, 45, 51, 76, 83, 89, 90, 91, 93, 97	, 17, 23, 29, 40, 50, 74, 75	03, 34, 54, 63, 66, 84, 85, 94, 95
2016	03, 12, 14, 16, 19, 21, 22, 26, 32, 33, 34, 35, 37, 38, 39, 45, 56, 57, 59, 61, 63, 64, 65, 71, 79, 84, 87, 90, 96, 99	04, 05, 23, 25, 28, 29, 31, 42, 43, 51, 67, 69, 72, 74, 86, 89, 91, 97	41, 52, 66, 75	02, 06, 07, 08, 09, 11, 18, 20, 40, 47, 48, 60, 68, 70, 78, 82, 83, 85, 88, 94, 95	10, 27, 36, 46, 49, 50, 53, 54, 55, 58, 73, 76, 80, 81, 93	01, 13, 15, 17, 24, 30, 44, 62, 92
2017	04, 15, 28, 40, 47, 72, 74, 76, 78, 79, 80	08, 11, 14, 19, 20, 25, 29, 38, 42, 45, 50, 91, 93, 97	01, 07, 13, 23, 34, 48, 61, 68, 87	24, 26, 33, 43, 67, 85, 86, 95	02, 03, 06, 09, 10, 12, 16, 17, 18, 21, 22, 30, 31, 32, 35, 36, 37, 39, 41, 44, 46, 49, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 62, 63, 64, 65, 66, 69, 70, 71, 73, 75, 82, 83, 84, 88, 89, 90, 92, 94, 96, 99	05, 27, 81
2018	13, 21, 23, 25, 28, 31, 33, 38, 39, 44, 46, 53, 72, 73, 76, 81	10, 12, 14, 16, 17, 18, 22, 26, 35, 36, 37, 42, 48, 49, 50, 59, 61, 62, 65, 66, 70, 79, 82, 87, 88, 93, 95, 96, 99	01, 04, 07, 19, 24, 41, 55, 60, 71, 80, 91, 92	05, 29, 30, 45, 67, 69, 74, 84, 97	02, 03, 06, 08, 09, 11, 15, 20, 32, 34, 40, 43, 51, 52, 54, 55, 57, 58, 63, 64, 68, 78, 83, 85, 86, 89, 90, 94	27, 47, 75
2019	08, 10, 11, 12, 13, 15, 16, 19, 21, 22, 23, 28, 30, 33, 34, 38, 40, 64, 67, 71, 72, 74, 75, 78, 79, 80, 81	14, 17, 24, 32, 35, 47, 53, 56, 87, 88, 89, 91, 99	48, 50, 55, 57, 92	18, 20, 26, 27, 31, 39, 42, 63, 65, 68, 73, 83, 85, 86, 90, 93, 94	01, 02, 03, 04, 06, 07, 25, 29, 36, 37, 41, 43, 44, 45, 46, 49, 51, 52, 54, 58, 59, 60, 61, 62, 66, 69, 70, 76, 82, 84, 95, 97	05, 09, 96

Table 2 shows the position of competitiveness of Indonesian products in the export market. During 2014 to 2016 the grouping of product competitiveness in the rising star quadrant and a significant decline in 2017 and continued until 2019. On the other hand, during 2017 to 2019 the competitiveness of Indonesian export products decreased, which was marked by a shift from rising star to leading retreat. This decline in competitiveness must be the government's attention to encourage the competitiveness of export products, especially for each type of product in that quadrant.

The demand for cocoa and cocoa preparations, which are categorized as food ingredients, was relatively stable from year to year. Many food products use cocoa as the basic ingredients. In addition, exports of cocoa and processed cocoa benefitted from the world cocoa prices, which had increased since 2018. At the end of 2019, cocoa export performance only recorded a decline in exports of 2.8% y-o-y but did not experience a contraction. This weakening was due to the COVID-19 outbreak in almost all countries (Indonesia Exim Bank, 2021).

Using two analytical tools, RCA and DRCA, there are two types of competitive products produced in Indonesia. Analyzed by the two analytical tools, only the group of mineral fuels, mineral oils, and products of their distillation products are competitive in the international market. Fishery products showed an increasing export trend and competitiveness in the international market in 2000-2018 (Wicaksono, Sutandi, & Tembo, 2020). This finding shows that the competitive RCA products in the international market are naturally resourced commodities produced using medium and low technology. The DRCA results also show that the products with export opportunities are also naturally resourced, i.e., oils.

Conclusion

Some Indonesian export products are competitive and have the potential to seize opportunities in the international market, but these are mostly naturally resourced. In addition, these products may lose their competitiveness when other countries produce similar products but with more modern technology. In the future, Indonesia must encourage the export of products that do not entirely depend on natural resources. Preprocessing using modern technology should be a priority to give added value to the products to compete in the international market.

The results showed that the major shares of exports calculated by SRCA are: a) the group of mineral fuels, mineral oils, and distillation products; b) bituminous substances; stones, category of goods, animal/vegetable fats and oils and their cleavage products; processed edible fats; livestock. Meanwhile, DRCA showed that there are ten groups in the rising star category, namely natural rubber and its derivatives, cars and other motorized vehicles, fatty acids and their derivatives for industry, lignite, unforged lead, ferroalloys, wires, cables, and the like, refined copper, petroleum oil and mineral oil, margarine and its derivatives. This indicates that in 2015-2019 these products grew both in Indonesia and in the world, but the growth in Indonesia was higher than the global market.

From the results of the SRCA and DRCA calculations, it can be seen that from 2013 to 2019, the competitiveness of Indonesian products in the world trade experienced a shift. This shows that Indonesia's competitiveness is not always consistent in the world market due to various aspects, such as commodity price volatility and Indonesia's dependence on imported products. However, the key takeaway is that the competitive Indonesian products are dependent on natural resources and processed using low technology, which results in low added value and is highly susceptible to the price instability in the world market. The calculation of product competitiveness in international trade showed that agriculture products and those processed using medium and low technology are competitive. Aside from expanding the market share, a strategy that the government can benefit from is increasing exports of goods and services based on the analysis of the global production chain.

The current study also shows that potential destination countries are not aligned with each Indonesian product's competitiveness. In other words, Indonesia will get more advantage if it exports a competitive product to the correct destination country. The findings in this study suggest the Ministry of Trade of the Republic of Indonesia increase export market access through 1) strengthening market intelligence; 2) accelerating negotiations and settlements; 3) conducting economic diplomacy for safeguarding, deepening, and expanding export markets; 4) integrating promotion and trade missions, buying missions, exhibition participation, and positive campaigns for Indonesian products; 5) establishment of Indonesian international cooperation funding agencies; and 6) repositioning and strengthening the roles of trade representatives abroad.

In addition, there should be integration in marketing networks and production chains through 1) increasing independence, competitiveness, and standards of export products; 2) Increased participation in Global Production Network (GPN) and Global Value Chains (VGC); 3) strengthening export support infrastructure (including logistics); 4) increasing the continuity and standardization of products from upstream to downstream; and 5) strengthening logistics management institutions. Finally, the government should also increase the added value of export products through 1) diversification of export products, specially manufactured products with medium-high technology; 2) increasing service exports; and 3) assistance and facilitation of small and medium industries with export orientation.

Acknowledgment

References

Abdullah, R. & Rosjadi, I. (2021). Strengthening the Competitiveness of Indonesia's Loser Sector Products in RCEP Cooperation. *Journal of Economics and Behavioral Studies, 13*(3), 44–52. https://doi.org/10.22610/jebs.v13i3(j).3180

Aguiar, G. P., Da Silva, J. C. G. L., Frega, J. R., De Santana, L. F., & Valerius, J. (2017). The Use of Constant Market Share (CMS) Model to Assess Brazil Nut Market Competitiveness. *Journal of Agricultural Science, 9*(8), 174-180. https://doi.org/10.5539/jas.v9n8p174

Astrini, E. W., & Azzakiyyah, N. A. (2018). Comparative Advantage Measurement in ASEAN's Ten Leading Export Commodities: A Case Study of ASEAN-5. BISE: *Jurnal Pendidikan Bisnis dan Ekonomi, 4*(1), 22–37. Retrieved from https://jurnal.uns.ac.id/bise/article/view/17560

Balassa, B. (1965). Trade Liberalisation and "Revealed" Comparative Advantage. *The Manchester School, 33*(2), 99–123. https://doi.org/10.1111/j.1467-9957.1965.tb00050.x

Benalywa, Z. A., Ismail, M. M., Shamsudin, M. N., & Yusop, Z. (2019). Revealed comparative advantage and competitiveness of broiler meat products in Malaysia and selected exporting countries. *International Journal of Business and Society, 20*(1), 383–396. Retrieved from http://www.ijbs.unimas.my/index.php/volume-11-20/volume-20-no-1-2019/570-revealed-comparative-advantage-and-competitiveness-of-broiler-meat-products-in-malaysia-and-selected-exporting-countries

Bernardini Papalia, R., Calia, P., & Filippucci, C. (2014). Information Theoretic Competitiveness Composite Indicator at Micro Level. *Social Indicators Research, 123*(2), 349–370. https://doi.org/10.1007/s11205-014-0745-0

Bioeconomy Malaysia Report. (2015). *Revealed Comparative Advantage of Bio-Based Products: A Malaysian Case Study.* Bioeconomy Malaysia Report. Retrieved from http://www.bioeconomycorporation.my/wp-content/uploads/2017/08/Bioeconomy_Malaysia_Report_2015.pdf

Caliendo, L., Dvorkin, M., & Parro, F. (2019). Trade and Labor Market Dynamics: General Equilibrium Analysis of the China Trade Shock. *Econometrica, 87*(3), 741–835. https://doi.org/10.3982/ecta13758

Cinquetti, C. A. (2018). Comparative Advantages and Demand in the New Competitive Ricardian Models. *Foreign Trade Review, 53*(1), 29–48. https://doi.org/10.1177/0015732516681884

Constantinescu, L. M., & Panagoret, I. (2017). Digital economy a bridge to Romanian competitiveness from regional to global. *Journal of Science and Arts, 3*(40), 491-502. Retrieved from https://www.icstm.ro/DOCS/josa/josa_2017_3/a_12_Constantinescu_491.pdf

Ćorović, E., Gligorijević, Ž., & Manasijević, A. (2019). Revealed Comparative Advantages and Competitiveness of the Manufacturing Industry of the Republic of Serbia. *Economic Themes, 57*(3), 307–327. https://doi.org/10.2478/ethemes-2019-0018

Daulika, P., Peng, K.-C., & Hanani, N. (2020). Analysis on export competitiveness and factors affecting of natural rubber export price in indonesia. *Agricultural Social Economic Journal, 20*(1), 39–44. https://doi.org/10.21776/ub.agrise.2020.020.1.6

Erdem, T. (2020). Competitiveness of dried sector: A case study of world and Turkey. *Agricultural Economics (Zemědělská Ekonomika), 66*(8), 365–372. https://doi.org/10.17221/98/2020-agricecon

Erkan, B., & Aybudak, H. G. (2019). Comparative Specialization and Competition Analysis According to the Technology Hardware of Turkey and South Korea. *8th SCF*

International Conference on "The Economic and Social Impacts of the Globalization and Liberalization, 10-13 October, 92–98.

Falkowski, K. (2017). Innovativeness of belarusian economy through the prism of its competitive position in international trade. *CBU International Conference Proceedings, 5,* 120–127. https://doi.org/10.12955/cbup.v5.912

Fauziah, D., Riniati, R., & Wibisono, S. (2021). Analysis of Competitiveness and Factors Affecting the Level of Potato Export to Singapore and Malaysia. *Media Trend, 16*(1), 1-11. https://doi.org/10.21107/mediatrend.v16i1.5788

Figiel, S., & Kufel, J. (2013). Macroeconomic Performance and International Competitiveness of the Agro-food Sectors in the EU Countries: Implications for the Future CAP. *Procedia - Social and Behavioral Sciences, 81*, 405–410. https://doi.org/10.1016/j.sbspro.2013.06.451

French, S. (2017). Revealed comparative advantage: What is it good for? *Journal of International Economics, 106*, 83–103. https://doi.org/10.1016/j.jinteco.2017.02.002

Granabetter, D. (2016). Revealed comparative advantage index: an analysis of export trade in the Austrian district of Burgerland. *Review of Innovation and Competitiveness, 2*(2), 97–114. https://doi.org/10.32728/ric.2016.22/3

Hanson, G. H., Lind, N., & Muendler, M-A. (2016). The Dynamics of Comparative Advantage. *CESifo Working Paper Series 5622*.

Hossain, M., Dechun, H., Zhang, C., & Van, V. (2017). Dynamics of Comparative Advantage and Competitiveness of Textile and Apparel Industry: An Empirical Analysis for China and Bangladesh. *British Journal of Economics, Management & Trade, 16*(1), 1–19. https://doi.org/10.9734/bjemt/2017/30840

Indonesia Exim Bank. (2021). *Outlook Ekspor Komoditas Utama Indonesia 2021*. Indonesia Exim Bank. Retrieved from https://www.indonesiaeximbank.go.id/id/research/downloads/19

Irsahd, M. S., & Xin, Q. (2017). Determinants of Exports Competitiveness: An Empirical Analysis through Revealed Comparative Advantage of External Sector of Pakistan. *Asian Economic and Financial Review, 7*(6), 623–633. https://doi.org/10.18488/journal.aefr.2017.76.623.633

Khaliqi, M., Gurning, H. R. H., Novanda, R. R., & Simamora, O. N. (2020). Competitiveness Indonesia tea in international market. *IOP Conference Series: Earth and Environmental Science, 454*(1). https://doi.org/10.1088/1755-1315/454/1/012039

Khaliqi, M., Gurning, H. R. H., Novanda, R. R., & Simamora, O. N. (2020). Competitiveness Indonesia tea in international market. *IOP Conference Series: Earth and Environmental Science, 454*(1). https://doi.org/10.1088/1755-1315/454/1/012039

Łapińska, J., Huterska, A., Zdunek-Rosa, E. W. A., & Huterski, R. (2020). Poland's competitive position in foreign trade in sports articles and equipment with china and selected eu countries. *Journal of Physical Education and Sport, 20*(2), 1044–1049. https://doi.org/10.7752/jpes.2020.s2145

Laursen, K. (2015). Revealed comparative advantage and the alternatives as measures of international specialization. *Eurasian Business Review, 5*(1), 99–115. https://doi.org/10.1007/s40821-015-0017-1

Liew, S-L., Arip, M. A., & Puah, C-H. (2021). Determinants of Export Competitiveness of Agricultural Products in Malaysia. *International Journal of Business and Society, 22*(2), 618–636. https://doi.org/10.33736/ijbs.3747.2021

Obadi, S. (2016). Revealed comparative advantage and competitiveness in the EU-28 and the USA. *Ekonomické Rozhl'ady/Ecomomic Review, 45*(2), p243-259.

Oelgemöller, J. (2013). Revealed Comparative Advantages in Greece, Ireland, Portugal and Spain. *Intereconomics, 48*(4), 243–253. Retrieved from

https://www.intereconomics.eu/contents/year/2013/number/4/article/revealed-comparative-advantages-in-greece-ireland-portugal-and-spain.html

Qiao, M., & Ma, T. (2015). Analysis of Maxproximity and RCA with International Trade Data--Take China as an Example. *Proceedings of the International Conference on Advances in Energy, Environment and Chemical Engineering.* https://doi.org/10.2991/aeece-15.2015.92

Safi, S. K., Sanusi, O. I., & Tabash, M. I. (2022). Forecasting the Impact of COVID-19 Epidemic on China Exports using Different Time Series Models. *Advances in Decision Sciences, 26*(1), 102-127. https://doi.org/10.47654/v26y2022i1p102-127

Shahzad, K. (2015). An RCA Analysis of Textiles and Clothing in Pakistan, India, and Bangladesh. *The Lahore Journal of Economics, 20*(1), 157–168. https://doi.org/10.35536/lje.2015.v20.i1.a6

Siggel, E. (2006). International Competitiveness and Comparative Advantage: A Survey and a Proposal for Measurement. *Journal of Industry, Competition and Trade, 6*(2), 137–159. https://doi.org/10.1007/s10842-006-8430-x

Son, M. (2014). A Comparative Analysis on the Competitiveness of the Korean, Chinese and Japanese Fashion Industries: The Generalized Double Diamond Model Approach. *Fashion Business, 18*(6), 67–85. https://doi.org/10.12940/jfb.2014.18.6.67

Stellian, R., & Danna-Buitrago, J. (2019). Revealed comparative advantages and regional specialization: Evidence from Colombia in the Pacific Alliance. *Journal of Applied Economics, 22*(1), 349–379. https://doi.org/10.1080/15140326.2019.1627722

Wicaksono, B. R., Sutandi, T., & Tembo, S. (2020). Forecasting Fisheries Production in Indonesia. *Jurnal Ekonomi & Studi Pembangunan, 21*(2), 169–184. https://doi.org/10.18196/jesp.21.2.5039