



## **IS MALAYSIAN FISH EXPORT COMPETITIVE COMPARED WITH THAT OF OTHER ASEAN COUNTRIES?**

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### **ABSTRACT**

The persistent fish trade deficit of Malaysia may reflect the losing competitiveness of the sector. This study applies Revealed Comparative Advantage (RCA), Relative Trade Advantage (RTA), Revealed Competitiveness (RC) and Constant Market Share Competitiveness (CMSC) indices to assess the Malaysian fish export competitiveness against its five prominent ASEAN destinations (i.e., Singapore, Vietnam, Thailand, Indonesia, and Brunei) in 2009-2018. The study contributes to the literature by extending the scope of previous studies on the fishery sector competitiveness with a more advanced CMSC index that can identify potential markets for Malaysia, at the same time overcome the index number inconsistency problem under the traditional constant market share approach. Results reveal that Malaysia loses competitiveness in exporting fish. Also, from the result of CMSC analysis, Malaysia shows the least competitive fish export in Singapore but the most competitive in Thailand among the fish export destinations. Malaysia should venture more into downstream processing to add value to its fishery products and thus improve export. It is recommended that Malaysia concentrates more on Thailand, Vietnam, Indonesia, and Brunei markets where Malaysia enjoys a positive competitive effect besides further exploring other international markets for revitalizing Malaysian fish export.

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## 1. INTRODUCTION

Along with globalization, competitiveness has led researchers to focus on the competitiveness of a sector, namely the agriculture sector, since this sector (especially fisheries) plays a vital role in socio-economic development. Fisheries comprise one of the most highly traded products in an increasingly open and market-orientated world economy, characterized by rapid changes in consumer and market demands. In this context, the Strategic Plan for Association of Southeast Asian Nations (ASEAN) Cooperation in Food, Agriculture and Forestry 2016-2025 emphasizes the importance of the region's fisheries competitiveness. Competitiveness not only reflects the industry's ability to strengthen competitive positions but also significantly affects future opportunities in the food industry (Kaimakoudi, Polymeros, and Batzios, 2014). Hence, competitiveness has always become a subject of interest to researchers and investors.

ASEAN, one of the most dynamic regions due to its strong trade with each other and the world, accounted for 10.1% of the global fish export in 2019 as reported by the International Trade Centre (ITC, 2019). According to the Southeast Asian Fisheries Development Center (SEAFDEC, 2020), most ASEAN countries are among the major producers of fish and fishery products globally, where fishery production contributed around 20.13% to the world's total fishery production in 2018 (FishStat, 2019). Malaysia, with its strategic location at the heart of ASEAN, is among the world's leading fish producers and is consistently the world's dominant producer of marine products and aquaculture according to the Food and Agriculture Organization (FAO, 2020). In 2019, Malaysia exported US\$649.18 million worth of fish, an increase of 20.8% over 2018. However, with its 39th position among the global fish exporters in 2019, its imports were relatively far greater than the exports leading to a critical fish trade deficit since 2009 (Soh, Lim, and Chua, 2022, 2021; Soh and Lim, 2020; ITC, 2019). The higher trade deficit might imply the absence of Malaysia competitiveness in the international market (Gould, Ruffin, and Anderson, 1996). This may be due to Malaysian preference for imported food items, in which fish ranked second (5%) behind bread and cereals (8%) (Nordin et al., 2019).

Malaysian fisheries production mainly incorporates both marine capture and aquaculture in which the fast-growing aquaculture has been expanded for export. As mentioned by Asche et al. (2015), Malaysia typically exports high-value fish to foreign markets since consumers in these countries possess a higher willingness to pay for

high-quality seafood such as tiger prawn, white shrimp, grouper and others. These exports have a high potential to generate not only export revenue but also more employment opportunities and socio-economic advancement in the livelihoods of the coastal and rural communities in Malaysia (Nor et al., 2020; Watson et al., 2017); at the same time, diversifying (fishery) market opportunities and contributing to food security of neighboring countries (e.g., Singapore) through food protein supply (Teng, 2020). Nevertheless, the high fish exports are still unable to pay for the fish import bills given consumer preferences for imported fish in Malaysia (Nordin et al., 2019). The consistent high fish exports without proper policy, however, may harm the sector sustainability due to overfishing by commercial fisheries (Kumar et al., 2020).

ASEAN (2020) claimed that enhancing regional trade is fundamental to building resilience against current global uncertainties. For instance, during the COVID-19 outbreak, Malaysia continues to trade in agricultural and food products in ensuring global food security (World Trade Organization, 2020) with the help of the Department of Malaysian Quarantine Inspection Services for food safety purposes. Malaysia is also engaged in barter trade (or fish exchange) with some Southeast Asian countries such as Thailand and Indonesia (Jeevan et al., 2019). Barter trade, which typically means trade activities between opposite shores of the Straits of Malacca, creates mutual benefit.

As seen in the following Table 1, the top five ASEAN importers of fish from Malaysia in 2018 are Singapore, Vietnam, Thailand, Indonesia and Brunei with a total value of US\$199.05 million, accounting for around 37.08% of total Malaysian fish exports. ASEAN continues to remain as a Malaysian prime market for fish, with Singapore as the largest importer among these markets. Malaysia has continued to play a more crucial role as a fish exporter to ASEAN countries. For instance, in 2018-2019, Malaysia became the most dominant fish exporter for Singapore and Brunei while exports to Singapore, Thailand and Brunei also rose 1.1%, 18.1% and 157.3% year-on-year, respectively (ITC, 2019).

Besides Malaysia, other prime ASEAN fish exporters are Vietnam, Indonesia, Thailand, Singapore and Brunei (ITC, 2019). This also reflects stiff competition between Malaysia and the five countries' fishery sector. Malaysian performance in relation to these countries describes its relative advantage or disadvantage given the similar geographical factors, environmental resources and labour quality. The comparison between countries yields a fresh look at an intraregional fish trade from the perspective of Malaysia.

TABLE 1  
Major Importers of Fish from Malaysia, 2014-2019

Rank	Importers	Malaysian Exports (US\$ million)					
		2014	2015	2016	2017	2018	2019
1	China	24.816	39.731	44.279	45.568	109.532	227.368
2	Singapore <sup>a</sup>	100.651	91.177	92.406	88.552	94.466	95.537
3	Korea	38.986	27.496	27.782	34.799	50.172	62.829
4	Japan	64.727	53.790	46.243	46.757	34.130	40.109
5	Thailand <sup>a</sup>	18.495	23.623	37.691	27.859	32.309	38.156
6	Taiwan	16.654	19.595	23.904	33.790	31.223	36.356
7	Australia	47.925	37.949	40.348	28.593	32.830	30.656
8	Hong Kong	37.343	27.928	22.067	25.913	29.736	25.214
9	United States	195.124	56.556	14.500	16.698	18.376	19.602
10	Saudi Arabia	0.303	0.316	0.539	0.444	11.046	19.046
11	Vietnam <sup>a</sup>	86.012	83.878	120.947	121.305	42.033	12.939
12	Indonesia <sup>a</sup>	19.564	16.227	19.565	16.006	17.804	10.373
13	Brunei <sup>a</sup>	2.144	1.775	2.473	3.453	3.365	8.657
	Rest of the world	24.111	25.395	24.729	19.853	30.357	22.337

Note: <sup>a</sup> Refers to the top five ASEAN countries. Source: ITC, 2019.

To this end, this study aimed at analyzing the trend, performance and competitiveness of Malaysian fish exports in relation to these five ASEAN countries. This study adopts the indicators of Revealed Comparative Advantage (RCA), Relative Trade Advantage (RTA), Revealed Competitiveness (RC) and Constant Market Share Space (CMSS) for the selected countries, with a particular interest in the export market structure of Malaysian fisheries in terms of the Constant Market Share Competitiveness (CMSC) index. Selection of these indicators enhances the results' robustness and consistency of this study. The Balassa RCA index is defined as the ratio of a country's exports in a particular commodity category to its share of total merchandise exports (Balassa and Noland, 1989). The Vollrath RTA and RC indices assess the competitiveness patterns of a country in terms of the difference between exports and imports (i.e., net export) in which RC is in logarithm form. The CMSC index tells whether the competitiveness of a nation in the export destination is driven by the competitive effect (CE - the expansion in its own net share) or the growth effect (GE - the growth in the world or regional exports) in the CMSS framework by adapting the net relative change method. The first three summarize the export competitiveness in the international markets while CMSS and its competitiveness index (i.e., CMSC) geometrically identify specific markets and practical competitiveness for Malaysian fish exports. The study is distinctive from others since the combination of RCA, RTA, RC and the advanced CMSS method in analyzing the Malaysian fisheries in which the CMSS with its CMSC index solves the index number inconsistency problem occurring in the traditional CMS approach.

This paper is organized into five sections. The next section provides a literature review on comparative advantage and competitiveness. This is followed by the methodology section which explains the method used in evaluating competitiveness of Malaysian fisheries in relation to its five identified competitors. The paper then continues with findings and discussion, eventually followed by a conclusion and recommendations.

## 2. LITERATURE REVIEW

The law of comparative advantage is perhaps the most foundational concept in international trade theory. As claimed by Ricardo (1817), it is beneficial for countries to engage in trade with one another, exporting goods that they have a relative advantage in producing, leading to a mutual increase in economic welfare. In order to quantify

the export performance in terms of comparative advantage, there is a well-known computation called RCA (Balassa, 1965), which has been used in various sectoral studies, such as fisheries (Chandran and Sudarsan, 2012; Lee, 2020). To distinguish between comparative advantage and competitiveness, the CMSS analysis and CMSC index (Aisha Nuddin and Ibrahim, 2019; Aisha Nuddin et al., 2018) were built in relation to the index number theory (Milana, 1988).

Still relatively limited literature explores the export competitiveness of Malaysian fisheries. The main findings of pivotal studies are as follows: Chandran and Sudarsan (2012), investigated the India-ASEAN trade in fisheries, pointing out that Malaysia exhibited comparative and competitive advantage (RCA and RC) in exporting fish (i.e., live fish, crustaceans and molluscs); besides India showed competitiveness in all products except fish fillets. There was trade complementarity between India and ASEAN. Rani, Immanuel, and Kumar (2014) focused on India and emerging countries ornamental fish exports, and deduced that during 1991-2009, India recorded a positive trade advantage (RCA) and export competitiveness but the exports were less competitive in Malaysia due to the negative CE. With additional regression analysis, world ornamental fish export, world price (except Indian price) and export price of Indian ornamental fish are significant factors affecting the exports. Furthermore, Lee (2020) analyzed the case for ASEAN countries' crustacean export to Japan and discovered that only Malaysia reported comparative disadvantage (RCA) in the exports. Unlike Rani et al. (2014), the outcomes of random effects conclude that Acute Hepatopancreatic Necrosis Disease (AHPND) and the exchange rate were significant toward the RCA during 2010 - 2016.

Besides the Balassa and Vollrath indices, the Constant Market Share (CMS) analysis has been popular since the pioneering work of Tyszynski (1951) in international trade. Aisha Nuddin et al. (2018) introduced a geometric CMSS analysis and the CMS net-share approach index (or called CMSC index). This is aligned with Porter, Ketels, and Delgado (2007), which deduced that the most intuitive definition of competitiveness is a country's share of world markets for its products. When a country gains from other countries' spending, competitiveness is a zero-sum game. The CMSS analysis can be explained in terms of two factors: the growth and competitive effects. The growth effect (GE) means the increment or decrement in the quantity of a country's exports that are led by changes in the global or regional exports only (with the country's exports share remaining constant). In contrast, the competitive effect (CE) implies the

increment or decrement in the quantity of a country's exports based on the changes in the country's market share (with the world or regional exports remaining constant). This new and simple method has solved the inconsistency problem faced by the traditional approach. By implementing this method in the Malaysian profit-loss-sharing (PLS) financial instruments, Aisha Nuddin and Ibrahim (2019) observed that the Islamic non-PLS mode of financing was the most competitive transaction mode while the least competitive was the conventional mode in 2015.

This paper is designed to fill the gap in the previous literature by comprehensively analyzing the trend and performance of Malaysian fish exports in comparison with the major ASEAN destinations as well as the Malaysian fish export competitiveness to the destinations with a particular interest in applying the more advanced CMSC index on most recent data.

### 3. METHODOLOGY

#### 3.1 REVEALED COMPARATIVE ADVANTAGE

The Balassa index, also known as RCA, is commonly used to identify a product where the target country has an advantage in international export competitiveness. If the RCA value is more than one, the product exerts comparative superiority or strong competitiveness. If the RCA value is less than one, the product does not exhibit comparative superiority; or it has weak competitiveness. The formula of RCA (Balassa, 1965) is expressed as

$$(1) \quad RCA_{ij} = \frac{X_{ij}/X_i}{X_{wj}/X_w}$$

where  $X_{ij}$  represents the export value of  $i$ 's country in commodity  $j$ ;  $X_i$  is the total export value of  $i$ 's country;  $X_{wj}$  is the export value of the world in commodity  $j$ ; and  $X_w$  is the total export value of the world.

#### 3.2 RELATIVE TRADE ADVANTAGE

Before computing the Vollrath index- RTA, the value of RCA and Relative Import Advantage (RMA) should be calculated first. Relative Export Advantage (RXA) is identical to RCA. RMA, which analyzes whether the focus country possesses any sort of import advantage in a commodity or not, is measured as (Vollrath, 1991):

$$(2) \quad RMA_{ij} = \frac{M_{ij}/M_i}{M_{wj}/M_w}$$

where  $M_{ij}$  is import value of  $i$ 's country in commodity  $j$ ;  $M_i$  is the total import value of  $i$ 's country;  $M_{wj}$  is import value of the world in commodity  $j$ ; and  $M_w$  is the total import value of the world.

RTA consists of both import and export in its calculation. Countries with positive RTA indicate that they are highly export-oriented from their resources while countries with negative RTA import fish from other nations and then re-export it. Hence, a country with a positive RTA denotes strong competitiveness on its own. RTA (Vollrath, 1991) is presented as

$$(3) \quad RTA_{ij} = RCA_{ij} - RMA_{ij}$$

### 3.3 REVEALED COMPETITIVENESS

Another Vollrath measure- RC captures the difference between RXA and RMA in logarithm. The positive value of RC reveals a competitive advantage whereas a negative value means a competitive disadvantage. RC (Vollrath, 1991) is expressed as:

$$(4) \quad RC_{ij} = \log RXA_{ij} - \log RMA_{ij}$$

### 3.4 A GEOMETRIC FRAMEWORK FOR CMS ANALYSIS

This study focuses on the regional trade and the fishery competitiveness from a home country perspective within a given period, thus following the CMSS framework (Aisha Nuddin et al., 2018) where the new formulation of CE and GE is computed on the identity of traditional CMS by Milana (1988). GE is shown in the area of the trapezium  $\frac{1}{2}\Delta Q(s^1 + s^0)$  while CE is in the area of the other trapezium  $\frac{1}{2}\Delta s(Q^1 + Q^0)$ . This begins with the formulation presented by Aisha Nuddin et al. (2018),

$$(5) \quad \begin{aligned} \Delta p &= \frac{1}{2}\Delta Q(s^1 + s^0) + \frac{1}{2}\Delta s(Q^1 + Q^0) \\ &= GE + CE \end{aligned}$$



where  $p$  is the total value of home fish exports,  $Q$  represents the total value of world exports (home plus foreign exports),  $s = \frac{p}{Q}$  is the export share of the home country(s) to the world exports, CE denotes the competitive effect (or market share) on the exports whereas GE expresses the change in exports due to growth (structural) effects,  $\Delta$  symbolises the changes in value between the onset and the end of analyzing period (represented by the superscripts 0 and 1, respectively).

The two-dimensional CMSS has four square quadrants which can gauge every CE and GE for each of  $n$  countries for a given period where the CE and GE can be positive, negative or zero. The CE is labelled on the vertical axis (+/- CE) and the GE on the horizontal axis (+/- GE). The axes are labelled based on the Cartesian plane in which the center is the origin (0,0), where  $(CE, GE) = (0, 0)$ . The CE and GE for any of the  $n$  countries in an analyzed period can be represented by a single coordinate point in the CMSS (Figure 1). Points Y and Z are two representative countries' coordinates in which Z has positive values while Y has negative values for both CE and GE. In this case, Z is more competitive than Y due to its relatively higher position in terms of  $\Delta p$  within the CMSS (Figure 2).

FIGURE 1  
The CMSS

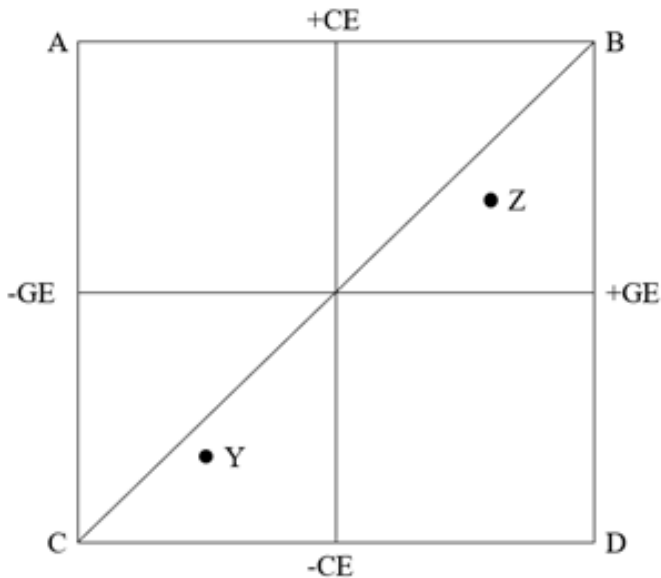
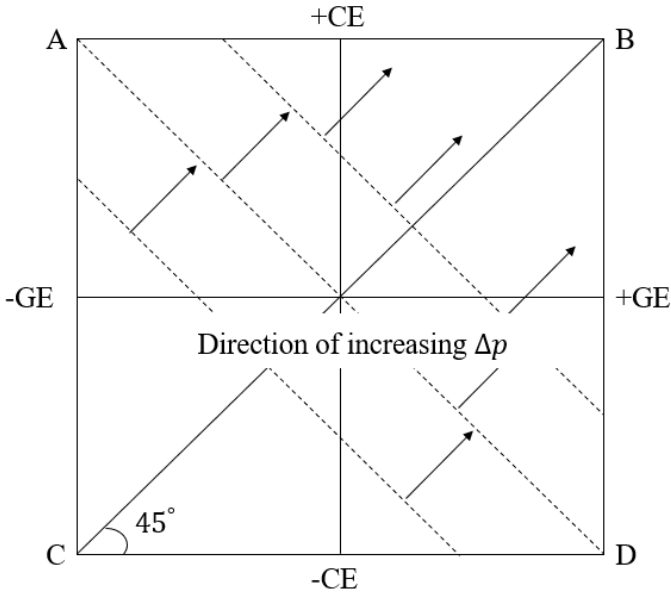


FIGURE 2  
Total Change in Exports  $\Delta p$  Isoclines



The CMSS for  $n$  countries is expressed in set notation as:

$$(6) \quad CMSS = \{(x, y) \mid -|\max(CE_t, GE_t)| \leq x \leq \max(CE_t, GE_t), -|\max(CE_t, GE_t)| \leq y \leq \max(CE_t, GE_t), t = 1, 2, 3, \dots, m\}$$

Assume a hypothetical CMS study of exports for  $n$  countries for a given number of years. This is written as follows where  $CE_i$  is the competitive effect of country  $i$ ,  $\sum_{t=1}^k CE_i$  is the sum of the CEs above the x-axis (which are all positive) and  $\sum_{t=1}^n CE_i$  is the sum of all the CEs below the x-axis (which are all negative). Given that the sum of all the CEs of the countries in the CMS analysis is equal to zero,

$$(7) \quad \sum_{t=1}^n CE_i = 0 \quad \text{implies} \quad \sum_{t=1}^k CE_i + \sum_{t=k}^n CE_i = 0,$$

$$\textit{therefore} \quad \sum_{t=1}^k CE_t = - \sum_{t=k}^n CE_t$$

### 3.5 THE CONSTANT MARKET SHARE COMPETITIVENESS INDEX

The CMSC index reflects the export competitiveness of the Malaysian fishery sector with respect to other countries within the above-stated CMSS. The index as simplified by Aisha Nuddin and Ibrahim (2019) based on Aisha Nuddin et al. (2018) is expressed as:

$$(8) \quad CMSC = \frac{s^1 - s^0}{\max(s_m^1, s_m^0)}$$

where the denominator,  $\max(s_m^1, s_m^0)$  represents the highest export share between these periods and  $\Delta s = s^1 - s^0$ , which measures the changes in the export shares of countries in a region for a given period, also symbolizes the “net share” of the export share where  $-1 < \Delta s < 1$  and  $\sum_{t=1}^n \Delta s_t = 0$ . If  $CMSC > 0$ , it means a country exhibits an increment in export competitiveness in terms of net share. Yet,  $CMSC < 0$  indicates a country suffers a loss in the market share and competitiveness.

Over two different periods, a country with the same CMSC indices might not possess the identical effect on the change in exports due to the difference between the total exports. In other words, the country might exert unequal CE values. By using this index, the export performance of countries can be compared over several different study periods and can also be analyzed in any field or sector.

### 3.6 DATA

The data applied in this study covers the period 2009-2018 and five ASEAN countries representing Malaysia fish export markets: Singapore, Vietnam, Thailand, Indonesia, and Brunei. The data were collected entirely from ITC. For the CMSS analysis covering 2017-2018, the fish import data from Malaysia for these five countries were obtained from the same source in which the values in all figures are presented in US\$ million. As mentioned by Tveterås et al. (2012), import data of each country from Malaysia is applied given its virtue, reliability and accessibility.

## 4. RESULTS AND DISCUSSION

### 4.1 REVEALED COMPARATIVE ADVANTAGE

The analysis of RCA is implemented to determine the comparative superiority of Malaysia in relation to the selected ASEAN countries from the export aspect only. Based on Table 2, Malaysia, Singapore, and Brunei reveal low median RCA (between 0.0614 to 0.4890) compared to Thailand, Vietnam, and Indonesia, which have high median RCA (between 1.6247 and 6.6820) in which the minimum RCA of Malaysia exceeds Singapore and Brunei only. Malaysia recorded RCA at 0.6036 in 2009 and it rose to a maximum of 0.6484 in 2010 that making the country place 4<sup>th</sup> among the six countries. Then, there was a continuous decline in the RCA to 0.3346 in 2018. The comparative disadvantage of Malaysian fisheries can be explained by lacking fishery production (World Bank, 2020b). Lower fish exports are likely to cause the fish trade deficit in Malaysia. The ongoing unfavourable fish trade balance is likely to pose a heightened risk to food security in Malaysia (Hamid, 2018); Malaysia is unable to produce a sufficient supply of fish (Ministry of Agriculture and Agro-based Industry, 2018). Singapore and Brunei also recorded a comparative disadvantage but the performance of Brunei is improving. Generally, the RCA of Singapore dropped from 0.1658 in 2009 to 0.1056 in 2018 whereas that of Brunei rose from 0.0134 in 2009 to 0.1859 in 2018. Similarly, this is caused by their relatively lower fishery production given Singapore's scarcity of agriculture (e.g., fish) resources (Hawksford, 2020) and the Brunei moratorium on new fishing licences in 2008 (Oxford Business Group, 2016). Thailand, Vietnam, and Indonesia enjoy comparative superiority in exporting fish although the RCA values of Thailand and Vietnam declined from 2.8382 in 2009 to 1.2098 in 2018 and from 11.0666 in 2009 to 4.0517 in 2018, respectively. Unlike Malaysia, the relatively higher fishery production of these three countries (World Bank, 2020b) leads to cheaper thus more competitive prices globally. Hence, the countries have higher fish exports and a positive fish trade balance (FishStat, 2019) except for the trade deficit of Thailand since 2013. At the same time, cheaper fish enhances food access (or security) (Wahab, Applanaidu, and Bakar, 2015).

Overall, Vietnam has the highest comparative advantage, followed by Indonesia, Thailand, Malaysia, Brunei, and finally Singapore. Malaysia export performance is mediocre among these countries.

TABLE 2  
RCA of Malaysia and other Fish Exporters, 2009-2018

Year	Malaysia	Singapore	Thailand	Vietnam	Indonesia	Brunei
2009	0.6036	0.1658	2.8382	11.0666	2.5674	0.0134
2010	0.6484	0.1575	2.7079	10.4957	2.3565	0.0208
2011	0.6352	0.1476	2.4987	9.5502	2.2451	0.0229
2012	0.5738	0.1346	2.3785	8.1596	2.7811	0.0356
2013	0.4920	0.1098	1.6726	6.9142	2.8218	0.0601
2014	0.4860	0.0938	1.5767	6.4498	2.9721	0.0627
2015	0.4090	0.1244	1.3426	4.8546	2.8664	0.0798
2016	0.3942	0.1161	1.3695	4.2461	2.9032	0.1554
2017	0.3452	0.1048	1.3277	4.2108	2.8583	0.1438
2018	0.3346	0.1056	1.2098	4.0517	2.8320	0.1859
Minimum	0.3346	0.0938	1.2098	4.0517	2.2451	0.0134
Maximum	0.6484	0.1658	2.8382	11.0666	2.9721	0.1859
Median	0.4890	0.12025	1.6247	6.6820	2.8269	0.0614

Source: Author's estimation.

#### 4.2 RELATIVE TRADE ADVANTAGE

The RTA analysis, which considers both export and import sides, has been done to verify the above RCA findings. According to Table 3, all countries reveal trade disadvantage in exporting fish (except Vietnam and Indonesia) that is reflected by the negative sign of both median and minimum RTA. The fishery sector of Malaysia registers a trade disadvantage during the years investigated. After its RTA was lowest at -0.3384 in 2015, it has been volatile, growing to -0.3092 in 2018. This means that compared to export advantage, Malaysia has more import advantage in sourcing cheaper fish from other countries (Ruban, 2016). Theoretically, lower imported fish price (Ruban, 2016) makes Malaysian consumers better off given their preferences (utility functions). Singapore and Brunei also suffer from a trade disadvantage but the former has a steadier constant trend than the latter. Consistent with the idea of Maskus (2016), the relatively higher income of Singapore and Brunei (World Bank, 2020a) enable them to purchase cheaper fish from other countries, therefore to gain higher utility. Yet, Brunei gains from import advantage compared to Malaysia and Singapore since only its RMA is above unity. Thailand has enjoyed a trade advantage till 2012, then it eventually lost its competitiveness,

which reached its lowest RTA value (-1.0056) in 2018. Both Vietnam and Indonesia have strong trade advantages (and export advantages). Vietnam experienced a continuous falling RTA from 10.4153 in 2009 to 3.0378 in 2018 whereas Indonesia has a stable pattern of the index. Unlike Malaysia, these two countries are major fish exporters in the world with a positive fish trade balance (ITC, 2019) and this may account for the findings that their export advantage exceeds import advantage.

Vietnam exerts the greatest maximum RTA (10.4153), followed by Indonesia (2.7671), Thailand (0.7173), Malaysia (-0.0953), Singapore (-0.2402) and Brunei (-1.2855). Collectively, the results are consistent with the above RCA findings (except in the case of Thailand since 2013) where the trade performance of Malaysia is average among these countries. The unexpected outcome in the Thailand case is because its RMA exceeds its RCA, reflecting that Thailand enjoys a relatively more import advantage in fisheries. The ongoing contraction in its fishery production, particularly due to the unexpected AHPND outbreak in 2013, makes it to suffer a great loss in competitiveness since 2013.

Countries with  $RTA < 0$  such as Malaysia are likely to confront a fish trade deficit since they rely on the fish trade with the selected ASEAN countries, which are also their closest competitors; their negative trade advantage reduces fish exports and vice versa. This, in turn, may result in food fish insecurity as developing countries such as Malaysia import more low-quality fish (Asche et al., 2015).

TABLE 3  
RTA of Malaysia and other Fish Exporters, 2009-2018

Year	Malaysia	Singapore	Thailand	Vietnam	Indonesia	Brunei
2009	-0.1760	-0.2414	0.5450	10.4153	2.3132	-1.2855
2010	-0.0953	-0.2470	0.7173	9.8014	2.0709	-2.1372
2011	-0.2021	-0.2594	0.4683	8.6423	1.9873	-1.8770
2012	-0.2983	-0.2402	0.1822	7.0920	2.5762	-1.8123
2013	-0.3058	-0.2473	-0.5055	5.9131	2.6073	-2.0505
2014	-0.3136	-0.2562	-0.3511	5.2167	2.7671	-1.6799
2015	-0.3384	-0.2976	-0.5813	3.7973	2.6358	-1.5856
2016	-0.3017	-0.3064	-0.7473	3.3063	2.6413	-1.6504
2017	-0.2984	-0.2787	-0.8815	3.2055	2.5768	-1.6339
2018	-0.3092	-0.2653	-1.0056	3.0378	2.5888	-1.3440
Minimum	-0.3384	-0.3064	-1.0056	3.0378	1.9873	-2.1372
Maximum	-0.0953	-0.2402	0.7173	10.4153	2.7671	-1.2855
Median	-0.3001	-0.2578	-0.4283	5.5649	2.5828	-1.6652

Source: Author's estimation.

### 4.3 REVEALED COMPETITIVENESS

In order to obtain more precise results, this study then adopts the RC index that gauges the competitiveness in logarithm. Table 4 shows that all countries (excluding Vietnam and Indonesia) have a negative median and minimum RC, thus confronting low competitiveness in fish exports.

Since 2010, Malaysia has witnessed an increasing absence of competitiveness in its fish exports, which is caused by the continuous dependency on the import of food such as fish (Chan, 2017) besides the aforementioned production issue. Similarly, Singapore has an overall growing competitive disadvantage from -0.3902 in 2009 to -0.5457 in 2018. Yet, the competitive disadvantage of Brunei dropped overall to -0.9153 in 2018. The fish import reliance, coupled with the falling fish production, results in a negative fish trade balance, where import exceeds export. Thailand has enjoyed comparative and competitive advantage until 2012; then it has increasingly lost its competitiveness, which reached its worst at -0.2627 in 2018. Singapore, Brunei, and Thailand also import more fish to fuel the increasing local demand (SEAFDEC, 2020). Vietnam and Indonesia had positive values of RC, indicating strong competitiveness. Vietnam experienced diminishing RC whereas Indonesia has a more stable pattern of RC. Unlike Malaysia, these two countries do not rely on food fish import as they have ample export and production capacity (SEAFDEC, 2020).

Generally, Vietnam records the highest (maximum) competitiveness, followed by Indonesia, Thailand, Malaysia, Singapore and eventually Brunei. Consistent with the findings of RCA and RTA, the competitive performance of Malaysia is moderate (ranked fourth) among these ASEAN members, which results in the trade deficit and food insecurity; thus the reason behind this is possibly linked to competitive and growth effects in different markets.



TABLE 4  
RC of Malaysia and other Fish Exporters, 2009-2018

Year	Malaysia	Singapore	Thailand	Vietnam	Indonesia	Brunei
2009	-0.1111	-0.3902	0.0926	1.2302	1.0043	-1.9874
2010	-0.0595	-0.4096	0.1337	1.1795	0.9165	-2.0165
2011	-0.1200	-0.4406	0.0901	1.0220	0.9399	-1.9182
2012	-0.1818	-0.4448	0.0346	0.8833	1.1325	-1.7149
2013	-0.2099	-0.5122	-0.1147	0.8393	1.1191	-1.5456
2014	-0.2162	-0.5718	-0.0873	0.7186	1.1613	-1.4438
2015	-0.2618	-0.5306	-0.1562	0.6619	1.0943	-1.3194
2016	-0.2469	-0.5611	-0.1891	0.6550	1.0448	-1.0652
2017	-0.2705	-0.5635	-0.2211	0.6221	1.0067	-1.0921
2018	-0.2843	-0.5457	-0.2627	0.6016	1.0663	-0.9153
Minimum	-0.2843	-0.5718	-0.2627	0.6016	0.9165	-2.0165
Maximum	-0.0595	-0.3902	0.1337	1.2302	1.1613	-0.9153
Median	-0.2131	-0.5214	-0.101	0.7790	1.0556	-1.4947

Source: Author's estimation.

#### 4.4 CONSTANT MARKET SHARE SPACE AND COMPETITIVENESS ANALYSIS

This study narrows down to CMSS and CMSC to further examine the Malaysian preponderance in the competitor markets compared to the case of Thailand since they share an almost identical background. Malaysia and Thailand are less-developed countries richly endowed with natural resources but they have undergone a fish trade deficit since 2009 and 2013, respectively. Table 5 represents the estimation of CMSC index, CE and GE when Malaysia and Thailand experience the rising fish export,  $\Delta Q = \text{US\$}20.815$  million and  $\text{US\$}18.434$  million from 2017 to 2018, respectively. The CMSS analysis (Figure 3) not only tells the ranking in export competitiveness of the destinations based on their positions but also increments in amount involved in the countries. All destinations show expansion of Malaysian and Thailand fish export and the positive growth effect (GE), implying increment in their export to each destination is led by the rise in total fish export ( $\Delta Q$ ).

In the Malaysia case, the greatest competitive export destination is Thailand based on the highest position in both CMSS and the positive value of the CMSC index (0.055). In the CMSS analysis, the increment in export competitiveness resulted from the CE factor that implies market share expansion, since it carries the (greatest) positive CE value ( $\text{US\$}5.8835$  million). As per the CMSC index, it is then followed by Vietnam, Brunei, Indonesia, and lastly Singapore. Malaysian fisheries lose export competitiveness in Singapore since the market exhibits a negative value of CMSC index (-0.0935) and CE ( $-\text{US\$}9.9928$  million) together with the lowest position in CMSS, indicating loss of most share among other countries. This means that Malaysia does not have any competitive effect (CE) in Singapore on its own. The positive GE symbolises the expansion of Malaysian export ( $\text{US\$}1.253$  million) and has resulted from the rise in Malaysian fish export. Other destinations such as Vietnam, Brunei, and Indonesia show significant competitive effects, signifying the advantage of Malaysian fish export in these markets besides Thailand. Malaysian exports to Indonesia report a positive CMSC index (0.004) with the smallest value in CE ( $\text{US\$}0.4325$  million). This is also illustrated in the coordinate point of Indonesia near the origin (Figure 3), representing only a minor enhancement in the amount and share of fish export.

Unlike Malaysia, the salient ASEAN markets of Thailand's fish export are Malaysia, Vietnam, Cambodia, Myanmar and

Singapore. The most competitive market of Thailand is Malaysia given its CMSC index (0.0145), CMSS position and CE (-US\$1.0636 million). Malaysia is also the market with the most Thailand export expansion of US\$12.905 million. Meanwhile, the least competitive market for Thailand is Singapore with its CMSC (-0.0136) and lowest position in CMSS where CE equals -US\$0.9959 million. Besides Malaysia, the Myanmar market also exerts a positive competitive effect on Thailand fish export while Cambodia has only a minor increment in the fish export (share).

Within ASEAN, Thailand, Vietnam, Indonesia and Brunei continue to be among the dominant markets for Malaysia exporters, and Malaysia should continue to tap into the demand for fish in these markets. Thailand enjoys export competitiveness in the Malaysia and Myanmar markets but loses competitiveness in Vietnam, Cambodia and Singapore. Malaysia records export competitiveness in more ASEAN fish markets than Thailand although both countries have export broadened in all selected markets. Malaysia and Thailand markets benefit each other in terms of competitiveness whereby Singapore is the least competitive destination for both countries.

TABLE 5  
 CMSC Index, Competitive and Growth Effects for Five Destinations of Malaysian Fish Exports Compared to Thailand's,  
 2017-2018

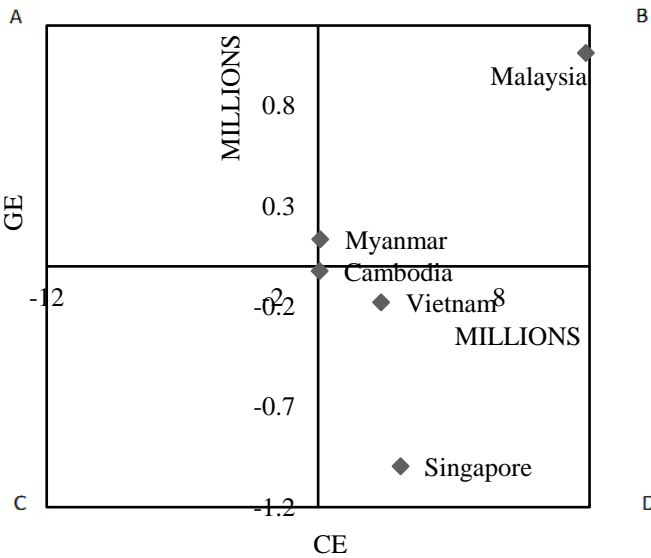
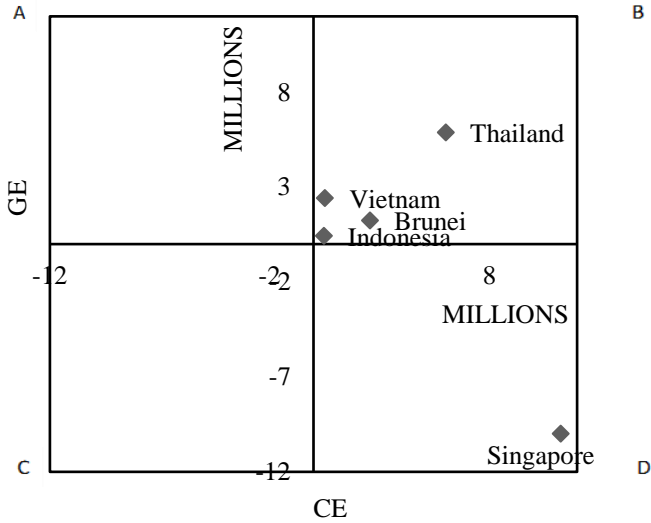
Malaysia									
Category	$p^0$	$\Delta p$	$p^1$	$s^0$	$s^1$	$\Delta s$ $= s^1 - s^0$	CMSC Index	$CE$ $= \frac{1}{2}(Q^0$ $+ Q^1)\Delta s$	$GE$ $= \frac{1}{2}(s^0$ $+ s^1)\Delta Q$
Singapore	101.015	1.253	102.268	0.5668	0.5138	-0.0530	-0.0935	-9.9928	11.2458
Vietnam	3.240	2.937	6.177	0.0182	0.0310	0.0129	0.0227	2.4248	0.5122
Thailand	48.807	11.908	60.715	0.2738	0.3050	0.0312	0.0550	5.8835	6.0245
Indonesia	3.790	0.899	4.689	0.0213	0.0236	0.0023	0.0040	0.4325	0.4665
Brunei	21.381	3.818	25.199	0.1200	0.1266	0.0066	0.0117	1.2519	2.5661
Total	$Q^0 =$ 178.233	$\Delta Q =$ 20.815	$Q^1 =$ 199.048	1	1	0	0	0	20.8150

TABLE 5 (continued)

Thailand									
Category	$p^0$	$\Delta p$	$p^1$	$s^0$	$s^1$	$\Delta s$ $= s^1 - s^0$	CMSC Index	$CE$ $= \frac{1}{2}(Q^0$ $+ Q^1)\Delta s$	$GE$ $= \frac{1}{2}(s^0$ $+ s^1)\Delta Q$
Malaysia	66.556	12.905	79.461	0.6377	0.6470	0.0094	0.0145	1.0636	11.8413
Vietnam	15.852	2.606	18.458	0.1519	0.1503	-0.0016	-0.0024	-0.1792	2.7852
Cambodia	0.416	0.049	0.465	0.0040	0.0038	-0.0002	-0.0003	-0.0226	0.0716
Mynmar	0.470	0.228	0.698	0.0045	0.0057	0.0012	0.0018	0.1341	0.0939
Singapore	21.078	2.646	23.724	0.2020	0.1932	-0.0088	-0.0136	-0.9959	3.6419
Total	$Q^0 =$ 104.372	$\Delta Q =$ 18.434	$Q^1 =$ 122.806	1	1	0	0	0	18.4340

Note: Estimates are one-year interval and numbers may not be equal to the total in a final row due to rounding. Source: Author's estimation.

FIGURE 3  
The CMSS of Malaysia (top) in Comparison to Thailand (bottom)  
Simulated Data from Table 5



## 5. CONCLUSION

Since Malaysia faces a continuous fish trade deficit, the competitiveness and performance of this sector should be assessed. This study provides empirical evidence for the competitiveness of Malaysia and its important fish export destinations (i.e., Singapore, Vietnam, Thailand, Indonesia, and Brunei) using RCA, RTA and RC over the period 2009 to 2018. Overall, Malaysia, Singapore, Thailand and Brunei incur weak comparative and competitive advantages in fish export, while Vietnam and Indonesia enjoy competitiveness in exporting fish. From the analysis of CMSS and CMSC index for 2017-2018, Malaysia shows the most competitive export in Thailand while Singapore is the least competitive destination. Malaysia also benefits from export competitiveness in more ASEAN fish markets than Thailand. Malaysia and Thailand are also vital markets that benefit each other in terms of competitiveness in which Singapore being the least competitive destination for both countries.

This study contributes to the fisheries literature with the recent competitive status of Malaysian fish exports relative to its ASEAN markets (in terms of RCA, RTA, RC and CMSC). It allows the Malaysian policymakers, traders and marketers to develop their long-term strategic plans regarding fisheries on which the ASEAN market exerts the highest potential (i.e., positive CE) for Malaysian fisheries, ultimately strengthening the export competitiveness of this sector. At the same time, the CMSC analysis succeeds in resolving the inconsistency problem arising in the traditional CMS.

Nonetheless, this study has several limitations. First, it centers on only one sector -- fisheries (i.e., HS 03 classification of products) where the results are measured at the macro level and do not take into account the quality since the fisheries across ASEAN countries are presumed to be homogenous goods. Second, this study incorporates a small sample of observed countries and generalization to a broader group of countries should be made with caution.

Future studies may investigate commodity levels, by considering the quality parameter and exploring more destinations, not limited to ASEAN countries only, but major fish importing countries such as the United States, Japan, and China. This study recommends that Malaysia venture more into downstream processing for added value fishery products, besides focusing on fisheries marketing strategies to improve exports in the ASEAN and world markets. Marketers ought to develop efficient fishery export strategic plans which concentrate more on the Thailand, Vietnam, Indonesia and

Brunei markets where Malaysia enjoys a positive competitive effect rather than following the old trend of exporting to Singapore where it has lost its competitiveness. Thailand, which possesses the highest potential market in terms of competitive effect, will be the most preferred export destination for strengthening the competitive status of Malaysian fisheries. Since the trade deficit may be an aftermath of the Malaysian dependency on trade with the ASEAN competitors, this study suggests Malaysia further discover other international fishery markets by participating in more bilateral and multilateral trade agreements.

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