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Research Article

The evaluation of the early impacts of the COVID-19 pandemic on the export of fishery commodities of Turkey

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ABSTRACT

Increasing attempts have been directed to understand the negative impacts of COVID-19 on different components of human life across the World. Fisheries and aquaculture sectors which are important sectors with high potential for export in the Turkish economy were immediately hit by the crisis. In this study, therefore, the early impacts of the COVID-19 on the export of aquatic products of Turkey were evaluated by using export data on quantity (kg) and customs value (USD) of the aquatic products belong to the first quarter period of 2019 and 2020. Fisher quantity index and price index showed that the mean values of exported products in both quantity and customs were decreased by 3.79% and 4.22% from 2019 to 2020, respectively. Drill-down analysis of export statistics showed that fresh Sea bass, Sea bream, Bluefin tuna, Carp were main exported products and Germany, the Netherlands, Spain, Italy, Russia, Greece, and Japan were main exported countries that determined the way and strength of the Turkish export on aquatic products. Their exports from 2019 to 2020 were changed as -7.89% (in quantity) and -7.43% (in customs value-USD). Frozen sea cucumber exported to China, Hong Kong, and the USA was decreased by 56.07%, 24%, and 5.5%, respectively. The export of frozen or fresh crab, shrimp, lobster, frozen fillet (trout, sea bream and sea bass) and live fish (sea bream and sea bass) were also decreased by 31.08% and 48.55%, respectively. In contrast to the general decrease, the quantity of fresh, live, and frozen snails, mussels, octopus, squid and cuttlefish exported to South Korea, Greece, and China was increased by 58.59%. Also, the export of dried, salted, or pickled and smoked fish (7.24% in quantity), canned aquatic products (26.63% in quantity) and frozen sea bass, sea bream, and tuna fish (7.56% in quantity) were increased. In conclusion, it was clearly identified that, in general, the products exported as mostly canned, frozen, and smoked fish have experienced an increase in demand. However, these increases have not been compensated for the decreases in demand for other products, yet. In that chaotic situation, therefore, the Turkish government should immediately fund the fisheries and aquaculture sectors. In the context of risk management, the government also should make new arrangements and promotions for processing industries (enhancing the capacity both in volume and in product variety) to protect and improve fishing and aquaculture sectors in the mid and long term.

Keywords
COVID-19
Fish export
Turkey

Introduction

2019 novel coronavirus (COVID-19) first appeared on 31 December 2019, in Wuhan City, Hubei Province, China (Estrada et al., 2020) and first cases were all associated with Wuhan's Huanan Seafood Wholesale Market (Lu et al., 2020; Sohrabi et al., 2020). Nevertheless, there is no

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evidence that the origin of COVID-19 originated from the seafood market, up to now (Guo et al., 2020). The World Health Organization (WHO) declared this outbreak on 11 March 2020 as a pandemic. Meanwhile, increasingly attempts have been directed to understand the negative impacts of COVID-19 on different components of human life across the World (Zeren and Hızarcı, 2020).

On 2 March 2020, Financial Times published an article on COVID-19 written by Yuval Noah Harari. He argued that *"Humankind is now facing a global crisis. Perhaps the biggest crisis of our generation. The decisions people and governments take in the next few weeks will probably shape the world for years to come. They will shape not just our healthcare systems but also our economy, politics and culture. We must act quickly and decisively. We should also take into account the long-term consequences of our actions. Global co-operation is vitally needed on the economic front too. Given the global nature of the economy and of supply chains, if each government does its own thing in complete disregard of the others, the result will be chaos and a deepening crisis. We need a global plan of action, and we need it fast"* (Harari, 2020).

The measures taken to limit the spread of the coronavirus pandemic, such as the closure of restaurants, open-air markets and limits on travel and tourism create a strong impact on the food supply chain. The fisheries and aquaculture are among the sectors most immediately hit by the crisis (Scholaert, 2020). Firstly, the two major industry events namely Seafood Expo North America (planned in March, 2020) and Seafood Expo Global (planned in April, 2020) was postponed. These kinds of international events create an environment to make deals in multifaceted ways for companies that specialize in sustainable aquaculture products. Therefore, companies relying on exported products were affected, in particular. For example, China produces 60% of the world's aquatic products. Chen Sheng, general manager of the Maoming Evergreen Aquatic Product Co. Ltd. from China, says *"in 2019, almost 200 Chinese firms had a presence there and every year we get 40-50% of our orders confirmed at Seafood Expo North America exhibition"* (Chun, 2020).

The demand and supply balance, the basic principle of the economy, shape economic activities (Gezmen et al., 2015). That pandemic has not only been affecting the export rates of aquatic organisms, but also it has been affecting domestic facilities relating the fisheries and aquaculture products by cutting or decreasing of the demands from the both abroad and domestic consumers and if it is not controlled in any way, it would be eventually hit the aquaculture and fishing sectors, dramatically. Because these sectors are so fragile due to their nature, unlike the other sectors like car industries. Therefore, every stages of production cycle in the fishery and aquaculture sectors depends on the next stage firmly. Also, the main workers involved in these sectors are characterized as low-income. As an example, it has been claimed that, in China, large tilapia farming firms work closely with small-scale farmers-often household operations-by providing juvenile fish and technical guidance, then buying up the mature fish. Meanwhile, the tilapia in the fish farms are getting big enough to be processed and exported. However, if processors do not buy them, the farmers cannot start the next cycle and the entire flow of the industry will be disrupted for the coming six months in 2020 (Chun, 2020).

In the context of risk management, some firms in the sectors like Norway Royal Salmon has cut its proposed shareholder dividend for 2019 from NOK 10 per share to NOK 5 to ensure its plans for the future remain on course in the face of the COVID-19 pandemic (Anonymous, 2020a). Aquaculture genetics, health and advanced nutrition company Benchmark Holdings has said demand for its salmon ova has not yet been materially affected by the COVID-19 epidemic, although it anticipates earnings will be hit in other parts of the business such as shrimp nutrition (Anonymous, 2020b).

On 11 March 2020, C-level seafood executives from around the world met in Bergen, Norway. They discussed issues and opportunities for the fisheries, and aquaculture, including climate change, increasing production, technology innovations, environmental sustainability ,and the coronavirus (COVID-19) that has been stoking fears worldwide, slowing industries and threatening vast economic impacts (Wright, 2020).

In Japan, the central wholesale market in Sapporo has taken an unusual response to suspend auctions in a *"simultaneous auction"* to prevent infection (FIS, 2020a).

In Spain, the Galician Government (Xunta) had informed the Spanish embassies in third countries about the difficulties that the Galician fleet that operates in its waters have been facing due to the coronavirus crisis. These efforts by the Galician Government to add support for the defense of the maritime-fishing sector against the situation of the

coronavirus are added to the contacts maintained with the Government of the State to which Galicia requested the authorization of direct and indirect aid for the sea-industry complex with the objective of overcoming the difficulties derived from the current health alert and the defense against Brussels of the modification of the European Maritime and Fisheries Fund (EMFF) to optimize the use of its resources. These demands coincide to a large extent with those that Spain transferred to the EU Executive (FIS, 2020b).

The European Commission has released Guidelines concerning the exercise of the free movement of workers during the COVID-19 outbreak (on 30.3.2020, C(2020) 2051 FINAL, Brussel). According to these guidelines, the fishermen are considered as workers in critical occupations and the Member States should allow them to enter the territory of the host Member State and have unhindered access to their place of work (EU, 2020). On 2 April 2020, the European Commission adopted a set of ambitious proposals to mitigate the socio-economic impact of the coronavirus in the fishery and aquaculture sectors. This initiative introduces additional measures and provides flexibility to the rules governing expenditure under the European Maritime&Fisheries Fund (EMFF). These measures are (i) to support for the temporary cessation of fishing activities (as provided for under Article 33 of the EMFF Regulation) and to back up the aquaculture farmers for the temporary suspension of production or additional costs (Article 55 of the EMFF Regulation), caused by the COVID-19 outbreak, without the usual limits ,and with co-financing by the EU up to 75%, (ii) to encourage the producers for the private storage of fishery and aquaculture products (see Articles 30 and 31 of the CMO Regulation for the storage aid mechanism and the prices below which the storage aid is triggered, and Article 67 of the EMFF Regulation which previously ended this measure in 2019), (iii) more flexibility in reallocating financial resources within the operational programs and a simplified procedure for amending them with respect to the new measures. The proposed measures, once approved by the European Parliament and the Council, would be eligible retroactively as of 01 February 2020 and will be available until 31 December 2020. This proposal strengthens the Coronavirus Response Investment Initiative proposed by the Commission on 13 March 2020 and the revised State aid rules under the new Temporary Framework, adopted on 19 March 2020, which aimed to bring immediate relief to the seafood sector (Scholaert, 2020).

FAO has evaluated the pandemic in a larger context including aquatic products in ten questions as follows: (1) Will COVID-19 have negative impacts on global food security?, (2) Whose food security and livelihoods are most at risk due to the pandemic?, (3) What are the implications of the COVID-19 situation–now and in the future–for food production, agricultural and fishery/aquaculture supply chains and markets? (4) How will the pandemic affect food demand? (5) What is the pandemic's impact on the global economy?, (6) What are FAO's recommendations to mitigate the risks of the pandemic on food security and nutrition? (7) What is the connection between COVID-19 and animals?, (8) Are there any risks from interacting with animals or consuming animal products?, (9) How has FAO responded to the COVID-19 outbreak?, and (10) What steps are FAO taking to protect its staff and to ensure that it will be able to continue to deliver on its mandate of fighting hunger? (FAO, 2020).

The fisheries and aquaculture are quite vital sectors with high potential for providing raw materials to the industry sector, creating employment opportunities and export in the Turkish economy. (Doğan, 1997; Can and Demirci, 2012; Şahinöz et al., 2017; Şimşek and Can, 2019). The annual aquatic production exceeded average 600,000 tons per year. A very important part of this production amount (177,539 tons) exported in 2018 and, nearly, 1 billion dollars was obtained, annually (Demirci et al., 2019). Turkey Exporters

Figure 1. The ranking of top 10 income derived by exporting the fishery products in Turkey in 2019 (Anonymous, 2020c).

Assembly Fisheries and Animal Products Sector Board Chairman Sinan Kızıltan underlined that Turkey exported aquatic product to 80 countries in 2019 (the most three were the Netherlands, Italy, and Russia) (Figure 1), resulting 1 (one) billion 21 million dollars customs value, and had been targeted to 1 billion 100 million dollars in 2020 (Anonymous, 2020c). But, the unpredictable truths resulting from that pandemic might be much more different than expectations. In this study, therefore, it was analyzed the first impacts of coronavirus pandemic on the export of fishery commodities of Turkey.

Materials and Methods

The data used in this study was taken from the Turkish Ministry of Trade. It comprises the export quantities of aquatic products (kg) and their total customs value (USD) from the first quarters of 2019 and 2020. The export statistics belonging to the aquatic products were classified according to the Harmonized System (HS) Codes (Table 1).

Two basic indexes were used to determine the changing ratio (CR) of the first quarter values for each "HS-code" group of products between 2019 and 2020 years as;

$$Iq=100\times(Qi_{2020}-Qi_{2019})/Qi_{2019}$$

$$Ip=100\times(Pi_{2020}-Pi_{2019})/Pi_{2019}$$

where, *Iq:* index for quantity *(Qi)* of each *"HS-code"* group of products and *Ip:* index for price *(Pi)* of each *"HS-code"* group of products.

Two Fisher Price Indexes were calculated for quantity and customs value (price) to measure the total effect of COVID-19 phenomena on the Turkish aquatic export trade. The Fisher Price Index also called Fisher's Ideal Price Index, is a consumer price index (CPI) used to measure the price level of goods and services over a given period. The Fisher Price Index is a geometric average of the Laspeyres Price Index and the Paasche Price Index. It is deemed the "ideal" price index as it corrects the positive price bias in the Laspeyres Price Index and the negative price bias in the Paasche Price Index (Fisher and Shell, 1972; Fisher and Shell, 1998; CFI, 2020).

$$\text{Laspeyres Price Index} = \frac{\sum(P_{i,t}) \times (Q_{i,0})}{\sum(P_{i,0}) \times (Q_{i,0})} \times 100$$

$$\text{Paasche Price Index} = \frac{\sum(P_{i,t}) \times (Q_{i,t})}{\sum(P_{i,0}) \times (Q_{i,0})} \times 100$$

Fisher Price Index=(Laspeyres Price Index* Paasche Price Index)$^{0.5}$

- $P_{i,t}$ is the price of the individual item at the observation period
- $P_{i,0}$ is the price of the individual item at the base period
- $Q_{i,t}$ is the quantity of the individual item at the observation period
- $Q_{i,0}$ is the quantity of the individual item at the base period

Table 1. Harmonized System (HS) Codes with product description of exported aquatic products.

HS-CODE	PRODUCT DESCRIPTION
3.01...	Alive fish
3.02...	Fish (fresh or chilled) (Excluding fish fillets and other fish meat of heading 03.04): -Salmon, (Excluding edible fish offal in subheadings 0302.91 and 0302.99):
3.03...	Fish (frozen) (Excluding fish fillets and other fish meat of heading 03.04): -Salmon, (Excluding edible fish offal in subheadings 0303.91 and 0303.99):
3.04...	Fish fillets and other fish meat (whether minced) (fresh, chilled or frozen):
3.05...	Fish (dried, salted or pickled); smoked fish (whether cooked before or during smoking); fish flours, meal and pellets suitable for human to eat:
3.06...	Crustaceans (whether with their shells) (alive, fresh, chilled, frozen, dried, salted or pickled); smoked crustaceans (whether crusted) (whether cooked before or during smoking); crustaceans (with their shells) (whether steamed or water cooked, chilled, frozen, dried, salted or pickled); Flour, coarse flours and pellets of crustaceans suitable for human to eat:
3.07...	Mollusks (whether shelled) (alive, fresh, chilled, frozen, dried, salted or pickled); smoked mollusks
3.08...	Aquatic invertebrates other than crustaceans and mollusks (alive, fresh, chilled, frozen, dried, salted or pickled); Smoked of aquatic invertebrates other than crustaceans and mollusks (whether cooked before or during smoking); Flour, coarse flours and pellets of aquatic invertebrates (excluding crustaceans and mollusks) for human to eat:
1604...	Canned products

SIMPER (Similarity Percentage) was used for assessing which statistics were primarily responsible for observed differences among the groups of exported products (Clarke, 1993). Neighbor joining clustering based on Euclidean Similarity Index was used to evaluate a group of products (based on HS code), considering some statistics used in SIMPER.

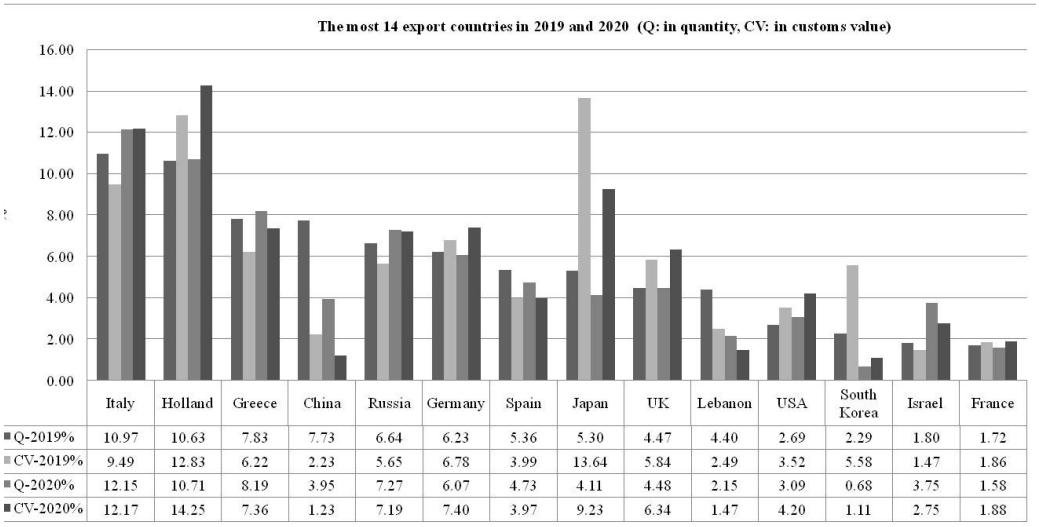
All calculations and statistical analyses were conducted using MS Excel and PAST software (v 3.20) (Hammer et al., 2001).

Results and Discussion

Based on Turkey's first-quarter export statistics from 2019 to 2020, a variety of aquatic products such as live, fresh, frozen, canned etc., were exported to 77 countries. The exported aquatic products from the first quarter in 2019 and 2020 as total quantity with customs value were 55212.01 tons with $ 280.012.231.11 and 54506.79 tons with $ 258.004.410.19, respectively. Among the most 14 being exported countries which cover more than 70 percent of the Turkish export for the aquatic products, considering the first quarter of years 2019 and 2020, the contribution of China, Germany, Spain, Japan, Lebanon, South Korea, and France to Turkey's to total exports have decreased at different rates, whereas Italy, the Netherlands, Greece, Russia, the UK, Israel, and the USA have increased (Figure 2).

The contribution rates of the exported of aquatic products to total export values in quantity (kg) and customs value (USD) with a the number of items and indexes for the years 2019 and 2020 categorized by their HS codes were given in Table 2, Figure 2, Figure 3 and Figure 4. When 9 main export groups were taken into consideration, an increase has been observed in 5 groups in 2020 compared to 2019 in terms of export in quantity. These groups were No-307 (58.59%), No-1604 (26.63%), No-304 (7.56%), No-305 (7.24%) and No-301 (0.90%). However, for the rest of the groups, the greatest decrease was in the No-308 group with 65.65%, followed by No-306 (40.59%), No-303 (13.76%), and No-302 (7.89%). In general, groups having to decrease or increase in quantity also presented the same pattern for the customs sales, except No-301.

As mentioned above, the serious fluctuations in both directions were observed in some groups of products (in No-308 with 65.65%, in No-306 with 40.59%, etc.). However, considering the year 2019 to 2020, the fisher quantity index and price index showed that the mean values of exported products in quantity and in customs value



	Italy	Holland	Greece	China	Russia	Germany	Spain	Japan	UK	Lebanon	USA	South Korea	Israel	France
Q-2019%	10.97	10.63	7.83	7.73	6.64	6.23	5.36	5.30	4.47	4.40	2.69	2.29	1.80	1.72
CV-2019%	9.49	12.83	6.22	2.23	5.65	6.78	3.99	13.64	5.84	2.49	3.52	5.58	1.47	1.86
Q-2020%	12.15	10.71	8.19	3.95	7.27	6.07	4.73	4.11	4.48	2.15	3.09	0.68	3.75	1.58
CV-2020%	12.17	14.25	7.36	1.23	7.19	7.40	3.97	9.23	6.34	1.47	4.20	1.11	2.75	1.88

Figure 2. The most 14 export countries of aquatic products with their contributions (%) to export of Turkey in a comparative representation from the first quarter statistics of the year 2019 and 2020.

Table 2. Indexes for quantity (Q, %) and customs value (CV, %) showing changing values from year 2019 to 2020.

HS-Code	Number of items		Total Export in quantity-Q (kg) x10000		Index for Q (%)	Weight in export Q (2019)%	Weight in export Q (2020)%	Total Export in customs value CV (kg)x10000		Index for CV (%)	Weight in export CV (2019) %	Weight in export CV (2020) %
	Exp. in 2019	Exp. in 2020	Exp. in 2019	Exp. in 2020				in 2019	in-2020			
No-301	9	7	1.52	1.54	0.90	0.03	0.03	103.94	53.47	-48.55	0.37	0.21
No-302	182	188	3196.02	2943.84	-7.89	57.89	54.01	14184.71	13130.07	-7.43	50.66	50.89
No-303	137	130	665.66	574.03	-13.76	12.06	10.53	2974.02	2125.80	-28.52	10.62	8.24
No-304	139	149	656.30	705.89	7.56	11.89	12.95	6071.93	5978.89	-1.53	21.69	23.17
No-305	21	22	113.80	122.04	7.24	2.06	2.24	1001.41	1065.86	6.436	3.58	4.13
No-306	30	17	15.85	9.42	-40.59	0.29	0.17	112.07	77.23	-31.08	0.40	0.30
No-307	38	36	79.99	126.86	58.59	1.45	2.33	422.29	702.07	66.25	1.51	2.72
No-308	12	9	38.90	13.36	-65.65	0.71	0.25	1054.13	444.60	-57.82	3.77	1.72
No-1604	93	103	753.16	953.71	26.63	13.64	17.50	2076.73	2222.44	7.01	7.42	8.61
Total	661	661	5521.2	5450.69				28001.23	25800.43			

decreased by 3.79% and 4.22%, respectively. To understand that phenomena, a work-breakdown analysis were used for export statistics. Firstly, we conducted Neighbor joining clustering based on Euclidean Similarity Index to show clustering or pattern group of products. For doing this, the following statistics were considered; index-Q, index-CV, items (%), WQ-2019 (%), WQ-2020 (%), WCV-2019 (%), and WCW-2020 (%). Clustering analysis identified 3 main groups of cluster as GROUP-1 (No-307, No-1604, No-305, and No-304), GROUP-2 (No-308, No-306, No-301, and No-303), and GROUP-3 (No-302) (Figure-5). Secondly, according to the SIMPER, the average contribution on dissimilarities of considered statistics were found in descending order as index-CV (32.92%), index-Q (31.04%), WQ-2019 (8.13%), items (7.85%), WQ-2020 (7.18%), WCV-2020 (6.53%), and WCV (6.35%).

Considering Cluster and SIMPER analyses together with statistics calculated, these three groups namely GROUP-1, GROUP-2, and GROUP-3 could be characterized as follows:

(i) GROUP-1: The most prominent member was No-307 that it was mostly composed of fresh, live, and frozen snails, mussels, octopus, squid, and cuttlefish. The total export in the quantity of these aquatic products was increased at 58.59 % in 2020 than in 2019. But these species had only 1.45 % and 2.33 % ratios in total exported aquatic products. Among the countries where these products were exported South Korea yielded the biggest increase with 67.89% (Index-Q) following Greece (Index-Q= 17.92%), and China (Index-Q= 11.12%). Other members of this group also had shown an increase in their index values with changing ratios. The product contentt of these

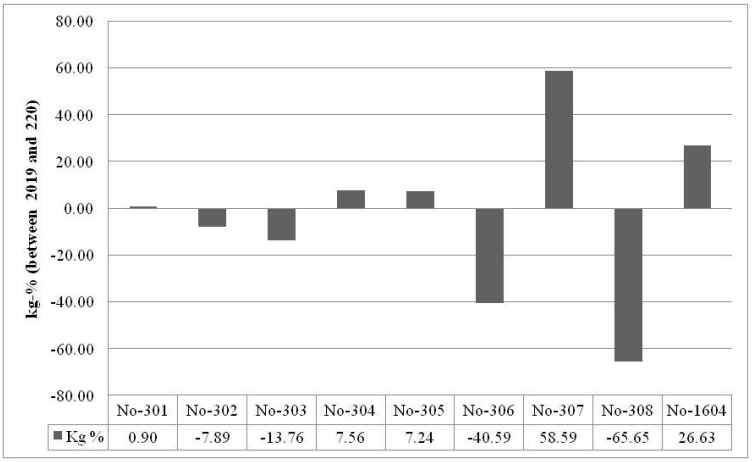


Figure 3. The changing rate of exported aquatic products in quantity based on HS codes from 2019 to 2020.

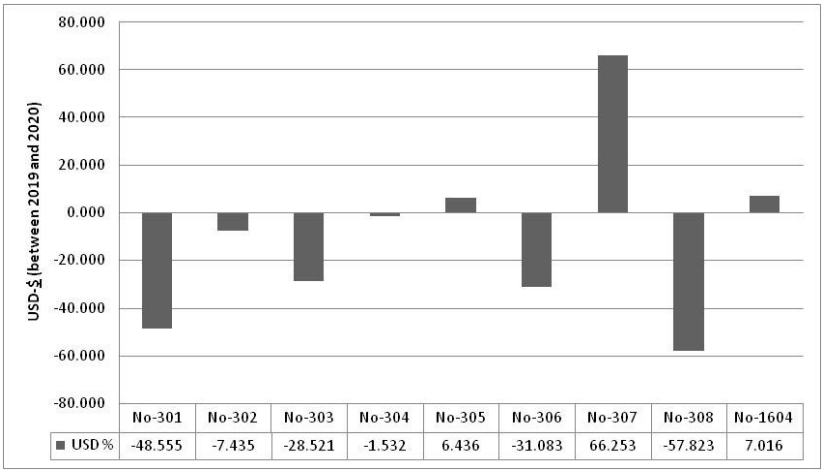


Figure 4. The changing rate of exported aquatic products in customs value based on HS codes from 2019 to 2020.

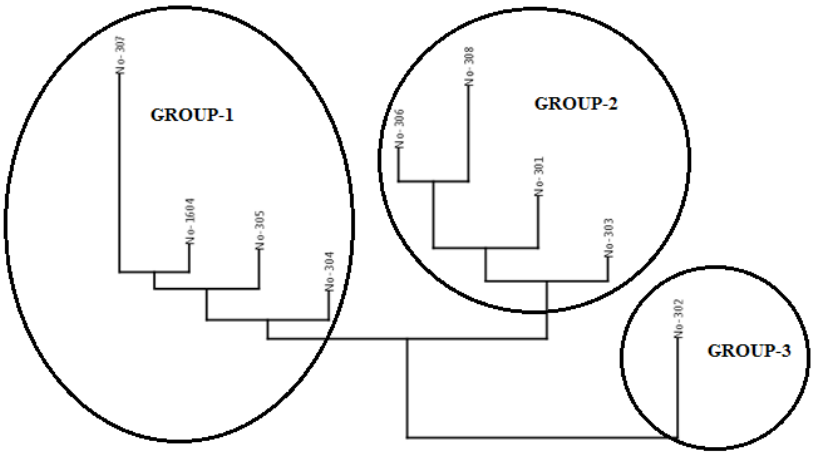


Figure 5. Neighbor joining clustering based on Euclidean Similarity Index.

product groups was fish (dried, salted ,or pickled) and smoked fish (No-305), canned aquatic products (No-1604), and frozen fish- sea bass, sea bream, tuna fish (No-304).

(ii) GROUP-2: All the members of that group were identified as having to decrease for export in quantity (Index-Q) and in customs value (index-CV), except No-301 with a 0.90% increase in the quantity. Both indexes values (index -Q = 65.65%, index-CV = 57.82%) were the highest in No-308 which frozen sea cucumber was dominant in export. For example, the decreasing of export rate in quantity of sea cucumber for China, Hong Kong, and the USA were 56.07%, 24%, and 5.5%, respectively. No-306 with 40.59% (index-Q) and 31.08% (index-CV) was composed of frozen or fresh crab, shrimp, and lobster. No-301 was composed of live fish including trout, sea bass, sea bream and freshwater aquarium fish. There was an interesting fact that the export quantity of No-301 was 0.90% increasing, while the customs value was decreased by 48.55%. In 2019, the live freshwater aquarium fish and trout were not exported to any country, but they were exported in 2020. Meanwhile, live sea bass export was suddenly stopped in 2020. Considering both opposite events, although the export of live freshwater aquarium fish and trout in quantity was increased and their quantity in total was 13.39%, whereas in customs values was only 0.88%. So, it can clearly be seen that their customs values

could not compensate for decreasing in the live sea bass export. No-303 was mostly composed of frozen fillet trout (42.61%), sea bream (21.24%), and sea bass (9.29%) and these products were decreased in quantity (index-Q) as 4.48%, 10.70%, and 54.08%, respectively.

(iii) GROUP-3: There was only No-302 in this group and it had the biggest one in terms of quantity (both in total weight and number of items) and customs value for export. No-302 contributed the aquatic export of Turkey in terms of quantity and customs values in 2019 (with 182 items) and 2020 (with 188 items) as 57.89 %, 50.66 %, and 54.01 %, 50.89 %, respectively. Therefore, this group of products may be called the "main backbone". So, it was why we preferred to start with as a base the No-302 for construction the "Neighbor joining clustering". Totally, the decrease in quantity and customs value of No-302 was 7.89% (Index-Q) and 7.43% (Index-CV). This group composed of fresh or chilled fish, excluding fish fillets and other fish meat. In this group, four items (sea bream, sea bass, bluefin tuna, and carp) contributed to more than 90% of the total export. The breakdown analysis of No-302 showed that sea bass and sea bream (fresh) and they are exported to some countries (Germany, the Netherlands, Spain, Italy, Russia, and Greece) have been determined the way and strength of the Turkish export on aquatic products.

Conclusion

A variety of aquatic products such as live, fresh, frozen, canned, etc. were exported to 77 countries. Among all, 14 being exported countries were cover more 70 percent of Turkish export for aquatic products, considering the first quarter of years 2019 and 2020, the contribution of China, Germany, Spain, Japan, Lebanon, South Korea, and France to Turkey's to total exports have decreased in different rates, whereas Italy, the Netherlands, Greece, Russia, the UK, Israel, and the USA have increased.

The fisher quantity index and price index showed that, the mean values of exported products in quantity and customs value were decreased by 3.79% and 4.22% from the year 2019 to 2020%, respectively.

More specifically, sea bass, sea bream, bluefin tuna, and carp (in fresh) and they are exported to countries (mostly, Germany, the Netherlands,

Item	Weight in export-Q (2019)	Weight in export-Q 2020	Index for Q	Index for CV	The most exported countries from 2019 to 2020 (Index for Q and CV)
Sparus aurata (Sea bream)	43.30	44.04	-6.10	+0.55	Germany (-6.10, -12.40)the Netherlands (+1.15, +8.25) Spain (-16.52, -7.10) Italy (+7.97, +18.75) Lebanon (-53.32, -45.09) Russia (+7.73, +17.58) Greece (+6.57, +16.01)
Dicentrarchus labrax (Sea bass)	35.42	38.57	+0.29	+4.02	Greece (+0.59, +1.60) the Netherlands (-10.61, -8.50) Italy (+8.28, +10.28) Russia (+14.47, +9.10)
Thunnus thynnus (Bluefin tuna)	9.41	7.07	-28.55	-37.89	Japan (-32.08, -43.28)
Carp species	6.37	3.46	-49.90	-78.41	Iraq (-69.66, -81.03) Syria (+21.51, +18.51)

Table 3. Summary of the breakdown analysis of No-302. (All units are percentage, %)

Spain, Italy, Russia, Greece, and Japan) have been determined the way and strength of the Turkish export on aquatic products. Their export were changed as -7.89% (in quantity) and -7.43% (in customs value-USD) from 2019 to 2020.

The frozen sea cucumber exported to China, Hong Kong, and the USA were decreased as 56.07%, 24%, and 5.5%, respectively. The export of frozen or fresh crab, shrimp, lobster, frozen fillet (trout, sea bream and sea bass) and live fish (sea bream and sea bass) export were also decreased.

In contrast to general decrease, the export of fresh, live, and frozen snails, mussels, octopus, squid and cuttlefish exported to South Korea, Greece and China in quantity was increased at 58.59 % in 2020 than in 2019. Also, the export of dried, salted or pickled and smoked fish (7.24 % in quantity), canned aquatic products (26.63 % in quantity) and frozen sea bass, sea bream, and tuna fish (7.56 % in quantity) have increased. But these increases have not been compensated for the decreases in demand for other products, yet.

In epitome, the products exported as mostly canned, frozen and smoked fish have been experiencing an increase in demand. That kind of trend has been also observed in the EU (Scholaert, 2020). In that chaotic situation, therefore, the Turkish government should immediately fund the fisheries and aquaculture sectors in the short term. In the context of risk management, the government also should make new arrangements and promotions for processing industries (enhancing the capacity both in volume and in product variety) to protect and improve fishing and aquaculture sectors in the mid and long term.

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