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Impacts of COVID-19 on U.S. Seafood Availability

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Abstract: Seafood is the food group with the highest share traded, and the U.S. is the world's largest seafood importer, importing 79% of the seafood consumed. Hence, a study examining the impacts of the measures to contain COVID-19 on U.S. seafood imports will not only show how U.S. seafood availability has been affected, but will also give strong indications of how resiliently the global seafood markets have worked through the pandemic. We find that U.S. imports of seafood actually increased in 2020 and 2021, suggesting supply chains were able to adapt to potential disruptions. Moreover, for the 14 largest product forms imported to the U.S., there are no strong price movements. Given that there is a global market for most species groups, this adaption also suggests that the markets have worked quite well beyond the U.S. Hence, while there have undoubtably been market shocks associated with the COVID-19 measures such as the reduction in demand from the restaurant sector and the increased sales in the retail sector, opportunities seem to balance out challenges, and the supply chains for seafood to the U.S. have been highly resilient.

Keywords: seafood, trade, U.S., COVID-19

1 Introduction

Early studies of the impacts of measures taken to limit the spread of the COVID-19 virus in 2020 tend to report evidence of reduced demand and trade for all goods due to demand and supply interruptions (Bartik et al. 2020; Espitia et al. 2021; Hayakawa and Mukunoki 2021), and specifically for seafood (e.g. White et al. 2021; Bassett et al. 2021; Coll, Ortega-Cerdà, and Mascarell-Rocher 2021; Gordon 2021; Lebel et al. 2021; Link et al. 2021; Vasse and Wolff 2022; Asche et al. 2022a; Schmitz and Nguyen 2022; Straume et al. 2022).[1] However, this literature often relies on indicators or interviews, as a significant time lag exists before actual data on production, prices, and trade are made available.[2] Increasingly, evidence is also provided that the impacts of the COVID-19 measures are mixed, and while the measures create challenges for some agents and in some supply chains, they provide opportunities for others. For instance, while seafood demand at restaurants in the U.S. were significantly reduced due to the COVID-19 strictures, retail sales increased by almost 30% (Love et al. 2021). Since some species and product forms are more important in the retail sector, and others are more important in the restaurant sector (Love et al. 2020, 2022), this shift in sales may be positive for some products while negative for others. Another example of mixed effects is Yang, Asche, and Li (2022), who show that in China the prices of a number of vegetable staples increased strongly in response to the lockdowns but that there were only limited impacts on meat and seafood prices.

In this paper we investigated whether U.S. seafood availability changed due to the COVID-19 measures. The main focus is on U.S. seafood imports, as 79% of the seafood consumed is imported (NMFS 2022a), and import data are readily available. The paper also examines domestic landings and exports to assess the impacts to total consumption. The results shed light on the impacts of the Covid-measures more generally, as the U.S. is

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1 A number of measures have been taken by various countries to limit the spread of COVID-19, starting in China in January 2020 (Yang et al. 2022). These measures include government mandated strictures at regional and national levels such as lockdowns with strong limitations on movement of people and goods (store closures and limitations on people leaving home or attending work), and quarantine requirements for infected people as well as people who have been in contact with infected people. Measures also include a number of voluntary behavioral responses such as people self-quarantining to reduce exposure to the virus (Goolsbee and Syverson (2021).

2 Asseng et al. (2021) provide an interesting perspective on forecasting of food production and show that predictions are doing particularly poorly when there is a high degree of uncertainty.

the world's largest seafood importer (FAO 2022) and as there are global markets for the main species groups (Anderson, Asche, and Garlock 2018).

As the world's largest importer by value, the U.S. is importing seafood from a large number of countries all around the world (Shamshak et al. 2019). The U.S. also has significant quantities of seafood shipped out for processing in other countries, particularly China, and re-imported to the U.S. (Asche et al. 2022b). Globally, seafood is the food category with the highest trade share (Anderson, Asche, and Garlock 2018), and Tveteras et al. (2012). They estimate that as much as 78% of the global seafood production is exposed to trade competition. As such, disruptions to U.S. seafood imports will show up also in the production and/or exports, as well as in other markets exposed to the global trade network. Similarly, if the COVID-19 measures have limited impacts on U.S. seafood imports, the impacts are likely to be limited in most other markets.

The impacts of lockdowns and other COVID-19 related measures can take several forms depending on the degrees of flexibility of producers, supply chains, and markets. At the production level, fisheries landings are more flexible than aquaculture production. Fishers are only harvesting nature's bounty and not actually producing the fish, and the actual production decision involves only the decision whether or not to go fishing. As such, in the short run a large share of the total cost is variable for fishers, as many costs (e.g. fuel, crew shares) are only incurred if a fishing trip is conducted. This structure makes it relatively easy for fishers to quickly reduce landings in response to lower demand. The quick production response has the potential to limit downward pressure on prices but of course impact revenues. The production process in aquaculture is longer and often more than a year long (Asche, Oglend, and Kleppe 2017). Hence, the production process will have started a long time before the COVID-19 measures, and producers will have fish at market size as well as intermediate sizes when the market disruption occurs. The ability to adjust production in the short run is therefore limited, as significant costs have already been incurred. One would accordingly expect that a strong reduction in demand would have a limited effect on the quantity produced in aquaculture, but a stronger price effect due to the limited opportunity to reduce production in the short run (Asche, Oglend, and Kleppe 2017; Oglend, Asche, and Straume 2022). For sectors where most of the production is highly perishable, such as the salmon sector, one would also expect more price volatility and less quantity adjustment than in sectors where products are more storable (Asche, Straume, and Vårdal 2021), e.g., supply chains that primarily handle frozen product.

The potential negative effects of COVID-19 related measures can be reduced or avoided if importers can find alternative suppliers and producers and exporters can re-allocate supply across different markets and product forms in response to any disruption in a specific supply chain or market. Lockdowns and other COVID-19 related measures did not occur simultaneously. Rather, they started in China in January 2020 (Yang, Asche, and Li 2022) and spread globally with the virus. In later phases, the impact of COVID-19 varied with the intensity of new virus variants and measures. As such, whether importers experience a reduction in aggregate supply will depend on the number of available sources and how flexible the supply chains are. The important insight is that if reduced supply from one source can easily be accommodated by shifting the demand to other sources, the aggregate supply facing the importers and their revenue and prices does not change very much. The same is true, of course, for suppliers, in that access to many markets and supply chains can be used to mitigate the effect of negative demand shifts in any specific market. As such, the global nature of the seafood market facilitates resilience, provided that the supply chains work sufficiently well and have been observed to spread supply shocks (Gephart et al. 2016).

In the next section, we provide an overview of U.S. seafood production, trade, and consumption. This is followed by an investigation of structural breaks in unit prices, quantities, and revenue for the monthly imports of the 10 largest products by value and by quantity at the 8-digit level in the HS-nomenclature, making up a total of 14 products (e.g. lobster meat is the 10th most important product by value, but 14th by quantity). We will also investigate whether there are significant changes in the source country for the imported seafood using a Herfindahl–Hirschman index (HHI).

2 The U.S. Seafood Market

The U.S. is one of the most important seafood markets in the world, as it is the fifth largest fishing nation and the world's largest importer of seafood. U.S. seafood consumption is dominated by imports, and NMFS (2022a) estimate that 79% of U.S. seafood consumption is imported. This is expected, given that the U.S. has one of the world's best fisheries management systems, which prevents over-exploitation of fish stocks but thereby prevents any significant increase in fisheries production and the U.S. aquaculture sector is marginal (Anderson, Asche, and Garlock 2019).[3] Globally, seafood production is rapidly increasing, primarily due to increased aquaculture production as landings of wild fish are stable (Garlock et al. 2020b, 2022).

Seafood imports had steadily increased in quantity and value for several decades prior to COVID-19, and the data indicate that import quantity also increased in 2020 and 2021. In 2019, the U.S. imported 2.66 million metric tons (mt) of edible seafood products valued at $21.93 billion (Table 1). Import quantity increased by 3.7% in 2020 although import value declined about 2.3%. As we will show later that there were no strong price reductions, the overall decline in value is primarily due to a change in the composition of the imports. The data also show a significant increase in U.S. seafood imports in 2021, with import quantity surpassing 3.0 million mt—a 12% year-on-year (YOY) increase.

Although the U.S. is heavily dependent on seafood imports to meet demand, the U.S. has substantial commercial fisheries in Alaska, the Gulf of Mexico, New England, and the Pacific regions. Prior to COVID-19, the landings data show that the fisheries production had been relatively stable, similar to global fisheries trends (Garlock et al. 2020b). In 2019, commercial fisheries landings were 4.25 million mt valued at $5.6 billion. In 2020, fisheries landings decreased to 3.8 million mt, a decline of about 10% YOY, and value declined to $4.7 billion—a 15% YOY decline. Alaska pollock, the most important fishery in the U.S. by volume, observed a 3.6% YOY decline between 2019 and 2020. The lobster fishery is the most important fishery by value, and it observed a 5% YOY decline in 2020. Pink salmon saw one of the largest YOY declines of 52%, although this is largely attributable to the biennial pink salmon run rather than impacts due to COVID-19 measures.

Table 1: U.S. edible seafood import, export, and domestic fisheries production quantity (Mill. mt) and value (Bill. USD). Imports and exports are in product weight and commercial fisheries production is in round weight.

	Imports		Exports		Commercial fisheries	
	Volume	Value	Volume	Value	Volume	Value
2017	2.65	21.45	1.41	5.40	4.52	5.83
2018	2.75	22.41	1.29	5.24	4.27	5.79
2019	2.66	21.93	1.22	4.87	4.25	5.69
2020	2.76	21.42	1.03	4.04	3.80	4.88
2021	3.09	27.92	1.09	4.82	–	–

NMFS (2022b).

An annual average of 1.2 million tons of seafood valued at $4.88 billion were exported each year over the last five years, reflecting that in general the U.S. is importing high-value seafood and exporting lower-value seafood. In 2020, both export quantity and value were down by 16% and 17% YOY, respectively. Exports rebounded in 2021 to 1.1 million mt, a 5% YOY increase from 2020, and export value was also up 19% YOY.

In aggregate, the increase in U.S. imports appear to have offset the decline in U.S. landings. In fact, NMFS (2022a) estimate that total U.S. supply of edible seafood increased about 3.8% between 2019 and 2020, despite the drop in supply from domestic fisheries. Moreover, it is interesting to examine the U.S. supply by species. Given that salmon, canned tuna, and shrimp were among the most consumed seafood products at home prior to COVID-19 (Love et al. 2020), one may expect that these species would take market share from species that are primarily sold in restaurants. It is interesting that the U.S. supply of canned tuna and shrimp increased, resulting from increases in domestic production as well as imports. The U.S. supply of salmon declined despite an increase of 6% YOY in imported salmon. The decline in supply resulted from a 40% YOY decline in domestic fisheries production, suggesting that the decline was a result of supply-side challenges rather than lack of demand for salmon.

China, India, Canada, Thailand, Indonesia, and Vietnam are the largest suppliers of U.S. imported seafood. China, India, and Canada lost U.S. market share in 2020, while Thailand, Indonesia, and Vietnam increased their market share; but the changes were not dramatic. Shrimp is by far the most important imported species. The trade data show that imports of shrimp increased by nearly 7% in 2020 compared to the previous year. This is consistent with increased demand for frozen goods during the pandemic, as most shrimp are imported frozen. Shrimp are also a seafood product that can be easily prepared at home, and more than one half of U.S. shrimp consumption occurred at home prior to COVID-19 (Love et al. 2020). Imports of shell-on and prepared product forms showed the largest increases, and there was little to no change in imports of canned, peeled, and breaded shrimp from the previous year.

3 However, there is still a preference for domestically produced seafood (Garlock et al. 2020a).

A large share of tilapia and salmon was consumed at-home prior to the pandemic, and imports of these products were up in 2020, with increases of 10% and 4%, respectively. The increase in salmon imports was driven by increased demand from fresh and frozen fillets, while imports of whole fresh fish decreased by about 10% and was likely associated with reduced demand at restaurants. Frozen fillets were the dominant product form of imported tilapia, and imports of frozen fillets increased by 9% from 106,433 mt in 2019 to 116,232 mt in 2020.

3 Imports of the Largest Products: Testing for Structural Breaks

To shed more light on the impacts of the Covid-measures on individual products, we test for structural breaks in the unit prices, quantities, and revenue for the monthly imports of the 10 largest products by value and quantity at the 8-digit level in the HS-nomenclature. The data collected is monthly U.S. import data for the period 2016–2021 provided by NMFS (2022b). This makes up a total of 14 products due to the large differences in unit values and are shown in Table 2. As one can see, there was significant variation in the price levels, with lobster meat fetching the highest price, and catfish the lowest.

Table 2: Average U.S. seafood imports by product form, 2016–2021.

Product	Quantity Mill. pounds	Value Mill USD	Price USD/pound
Shrimp, peeled frozen	307.1	2778.5	9.05
Salmon, Atlantic, fresh fillets farmed	157.6	1781.2	11.30
Shrimp, frozen other prep.	97.2	1030.1	10.60
Salmon, Atlantic, fresh farmed	123.2	975.8	7.92
Snow crab, frozen	50.7	945.0	18.65
Salmon, Atlantic, frozen fillet	52.7	658.7	12.49
Lobster, frozen	14.5	505.8	34.95
Crab meat, canned	21.1	488.0	23.15
Shrimp, frozen, shell-on 21/25 count	52.4	468.6	8.95
Tilapia, frozen fillets	117.6	433.9	3.69
Shrimp, frozen breaded	51.2	363.8	7.10
Pangasius, frozen fillets	91.0	298.7	3.28
Lobster, frozen meat	7.5	298.4	39.59
Tuna, canned	73.6	277.1	3.77

NMFS (2022b).

For the three data series, import value, quantity, and unit values at the product level, we ran the following linear regression model for the 14 products:

$$y_t = \beta_0 + \theta_t + \mu_t + u_{t,} \tag{1}$$

where y_t is the log of value, quantity, and unit value, θ_t is monthly dummies that control for seasonality and μ_t are yearly dummies.[4] We correct for potential autocorrelation and heteroskedasticity by reporting robust standard errors.

Since the COVID-19 measures were implemented at different times in various countries we do not specify a specific break point but use a CUSUM test for parameter stability that will find any structural break in the relevant period (Ploberger and Krämer 1992). The null hypothesis is that no structural breaks existed over the period of interest. As the impact time of the COVID-19 measures is not clear, we conducted one test in which the window where structural breaks were allowed for the period January 2020 to December 2021 and one for the period January 2018 to December 2022. The test statistics are reported in Tables 3 and 4. As one can see, none of the estimated test statistics can reject the null hypothesis of no structural change at any conventional significance level. Hence, there is no evidence for the presence of any structural breaks for any of the products over the period of interest.[5] Thus, the COVID-19 measures do not seem to have had a strong impact on U.S. seafood imports.

This is an important result given the global nature of the seafood market. We know that for species like salmon (Asche, Bremnes, and Wessells 1999; Salazar and Dresdner 2021) and shrimp (Asche, Oglend, and Smith 2022c), the price is determined at the global market and not in the U.S., and this is most likely true for most other species given the global market. As such, the fact that there is no impact of the COVID-19 measures (or other factors) on the import quantities, values and prices of the largest seafood products to the U.S. provides indications that: (a) global prices for major seafood products have not been impacted to a significant extent by COVID-19, and (b) as there is little evidence of disruptions in the imported quantities, many seafood supply chains have coped well with the challenges of the pandemic. We also know that the prices of different product forms tend to be highly correlated for moderately processed products (Landazuri-Tveteraas et al. 2021; Salazar and Dresdner 2021; Smith et al. 2017),

4 The base year is 2016 and the base month is January.

5 We also carried out the test with the levels of the variables. These tests gave the same conclusion.

Table 3: CUSUM test for structural breaks in the period January 2020 – December 2021[a].

Product	Test statistic, ln (value)	Test statistic, ln (quantity)	Test statistic, ln (unit value)
Catfish (Pangasius) fillet frozen	0.3122	0.5204	0.7198
Crab snow frozen	0.3071	0.4171	0.6542
Crabmeat swimming (Portunidae) in ATC	0.7578	0.7113	0.7756
Lobster (Homarus SPP) frozen	0.4375	0.3744	0.7387
Lobster NSPF meat cooked frozen	0.3350	0.3194	0.7553
Salmon Atlantic fillet fresh farmed	0.6550	0.5381	0.7411
Salmon Atlantic fillet frozen	0.4841	0.3996	0.7672
Salmon Atlantic fresh farmed	0.5847	0.3273	0.6724
Shrimp breaded frozen	0.4351	0.5864	0.7147
Shrimp frozen other preparations	0.7262	0.7413	0.5749
Shrimp warm-water peeled frozen	0.6291	0.5338	0.7847
Shrimp warm-water shell-on frozen 21/25	0.4408	0.3716	0.7558
Tilapia (Oreochromis SPP) fillet frozen	0.5909	0.5591	0.5577
Tuna NSPF in ATC (other) not in oil over quota	0.6314	0.5856	0.6628

[a]Critical values for the test are 1.6276 (1%), 1.3581 (5%) and 1.2238 (10%).

Table 4: CUSUM test for structural breaks in the period January 2018 – December 2021[a].

Product	Test statistic, ln (value)	Test statistic, lnn (quantity)	Test statistic, ln (unit value)
Catfish (Pangasius) fillet frozen	0.7257	0.5466	0.9362
Crab snow frozen	0.4619	0.4911	0.5453
Crabmeat swimming (Portunidae) in ATC	0.8210	0.7262	0.7078
Lobster (Homarus SPP) frozen	0.4251	0.3757	0.7337
Lobster NSPF meat cooked frozen	0.4715	0.4480	0.7734
Salmon Atlantic fillet fresh farmed	0.5426	0.6388	0.8109
Salmon Atlantic fillet frozen	0.3507	0.4831	0.9893
Salmon Atlantic fresh farmed	0.7528	0.5362	0.6828
Shrimp breaded frozen	0.5979	0.5954	0.8269
Shrimp frozen other preparations	0.7818	0.7812	1.1024
Shrimp warm-water peeled frozen	0.6531	0.5490	1.0401
Shrimp warm-water shell-on frozen 21/25	0.6101	0.5818	0.9517
Tilapia (Oreochromis SPP) fillet frozen	0.5413	0.4702	0.4502
Tuna NSPF in ATC (other) not in oil over quota	0.5325	0.4950	0.6583

[a]Critical values for the test are 1.6276 (1%), 1.3581 (5%) and 1.2238 (10%).

suggesting that these results also hold for product forms that are less important for U.S. imports.

4 Firms and Export Markets

Aggregate trade flows and prices are useful for an overall assessment of market impacts. However, the trade flows are the results of the actions of a number of firms in relation to different markets. Hence, there may be important changes in trade patterns even if the effects of the COVID-19 measures are not significant in aggregate. In this section we investigate whether there has been an impact on the composition of the source countries that the U.S. is importing seafood from. This will be investigated using the Herfindahl–Hirschman index (HHI), a quantitative metric that can measure concentration in a market. The HHI is computed as the sum of squared shares S_i, i.e., HHI = $\sum_i S_i^2$. The index takes values between 0 and 1, where it is close to zero if there is little concentration and close to one when there is a high degree of concentration. We provided two measures for each product; a HHI for the market shares and a HHI for the quantity shares computed based on annual shares.

If the COVID-19 measures or supply chain challenges were preventing some exporters from supplying the U.S., one would expect the associated HHI to increase if this shortfall is compensated by increased supply from existing suppliers. However, one may also observe weaker concentration if an important supplier disappears, and the quantities are made up by sourcing from a number of smaller suppliers. Figures 1 and 2 provide the two indexes for the 14 products, and the numerical values are provided in Table A1.

Figures 1 and 2 show that the HHIs vary significantly for different product forms. It is also interesting to note that for some products the HHI has a different level depending on whether the share is quantity or value

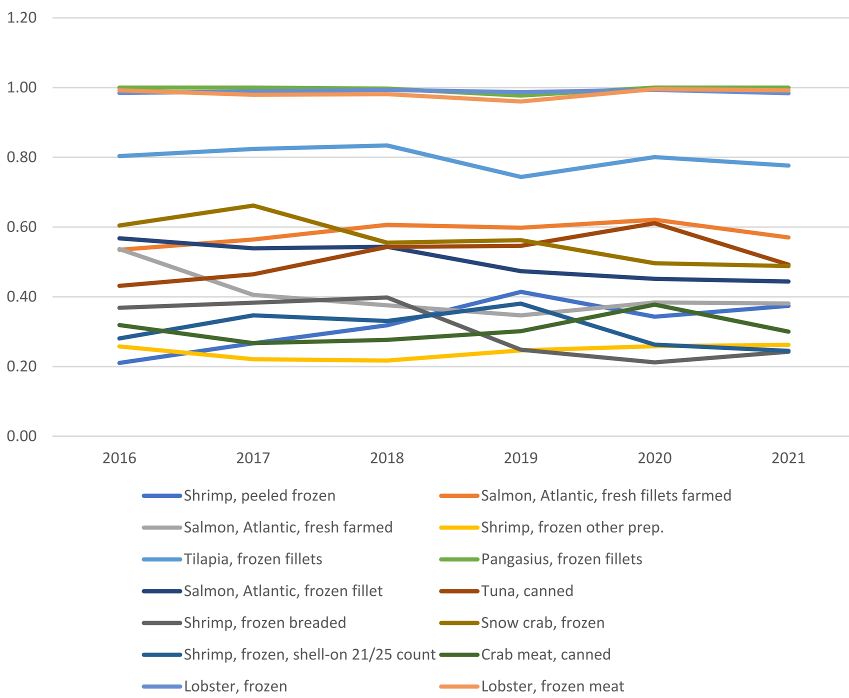

Figure 1: HHI for suppliers of US seafood imports by product (quantity shares).

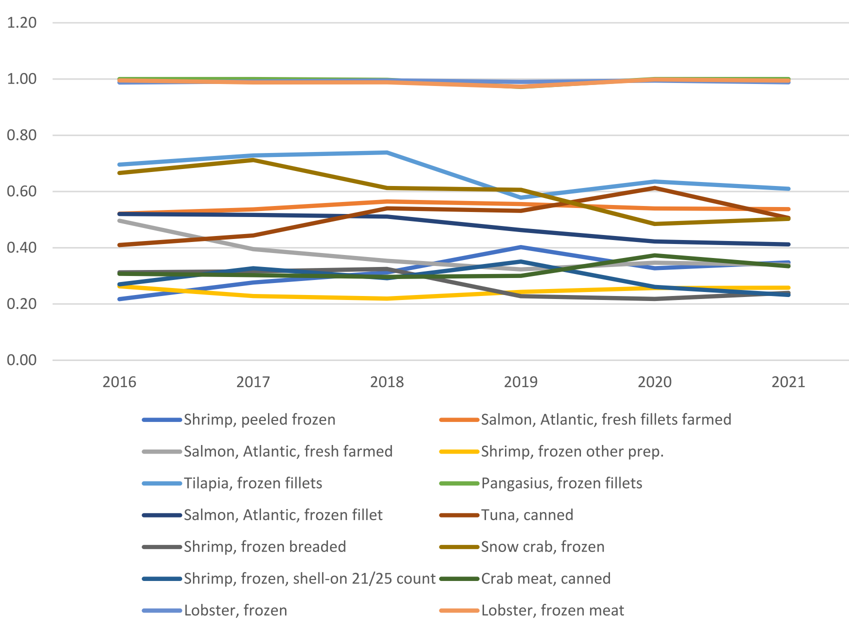

Figure 2: HHI for suppliers of US seafood imports by product (value shares).

based, highlighting the importance of different prices levels from different exporters. Some products have only one supplier country, like frozen pangasius from Vietnam and frozen lobster from Canada, and the lack of structural breaks found in the previous section indicates continued functioning supply chains from these countries. Tilapia is also relatively concentrated, although there is a significant difference in the quantity share index (about 0.8) and the value share index (about 0.6). This is due to the dominating role of China in terms of quantity, while South American countries provides higher priced fish of better quality (Nórman-Lopez and Asche 2008). Relatively to the anti-trust classifications where a market with a HHI higher than 0.25 is regarded as concentrated, the HHIs indicate that there are relatively few sources of U.S. seafood imports for several other products. This does not allow for market power to be exploited due to the global nature of the market in geographical as well as product space. For instance, the U.S. sources most of its salmon from Canada and

Chile due to geographical proximity. However, supply challenges in Chile in 2020 resulting from disease was resolved by increased supply from countries that normally are not important sources for the U.S. (Salazar and Dresdner 2021).[6]

Most of the HHIs were stable over the six-year period, and most exceptions did not show obvious responses associated with COVID-19 measures. Peeled and frozen shrimp was the only product that showed an obvious response in 2020. The HHI for peeled and frozen shrimp showed an increasing trend in the first four years followed by a decline in 2020 and a slight rebound in 2021. This was largely due to shrimp disease, as this had strong impacts on where shrimp was farmed and therefore sourced (Petesch, Dubik, and Smith 2021). India's market share of shrimp was increasing until it peaked in 2019 at 61%, and then India's share declined to 54% in 2020 as other countries, such as Ecuador, took over market share as India's production was declining. Minor increases in the HHI for canned tuna and canned crabmeat were found in 2020 indicating that imports were supplied from fewer suppliers, although both products had increasing HHI prior to 2020, so it is difficult to determine the extent to which this is related to COVID-19. Indonesia's market share of swimming crab increased from 51% in 2019 to 59% in 2020 and then declined to a share similar to 2019. Thailand, the largest supplier of canned tuna, gained market share of canned tuna in 2020, while Vietnam, Indonesia, and others lost market share.

Overall, the HHIs indicated that concentration levels for sources of U.S. seafood imports have not changed to any extent after 2019. This suggests that finding alternative suppliers has not been an important issue for the most traded products, as most supply chains have shown resilience to COVID-19 disruptions.

5 Discussion and Concluding Remarks

The COVID-19 pandemic and the different measures implemented to slow the spread of the virus have been perceived as a major challenge for trade in general and for a number of industries (Espitia et al. 2021; Hayakawa and Mukunoki 2021), and this has also been the case for seafood (Bassett et al. 2021; Love et al., 2021; White et al. 2021). The results reported in this article indicate that these are challenges that were largely overcome in the case of seafood. U.S. seafood imports have increased during the pandemic years, and the year-on-year increase from 2019 to 2020 was the largest year-on-year quantity increase this century until the change from 2020 to 2021.[7] Hence, overall seafood imports and availability have not been negatively impacted by COVID-19 measures. These results do not suggest that there have not been impacts. The literature clearly shows some strong impacts in different segments of the seafood market, particularly downstream, with the shortfall in restaurant demand and increased retail demand (Love et al. 2021). However, in aggregate, U.S. importers have been able to find alternative sources to the extent there have been supply chain disruptions.

Given that the U.S. is the world's largest seafood importer, the results are important, as they suggest that many seafood markets and supply chains have coped well with COVID-19 disruptions, at least at upstream levels in the chain. Tveteras et al. (2012) estimated that 78% of global seafood production is exposed to international trade competition, and for most seafood products there are global markets (Anderson, Asche, and Garlock 2018). The fact that there are no price spikes or strong price decreases suggests that the COVID-19 measures have not led to strong interruptions in supply or demand in the global seafood markets that the U.S. is a part of.

Hence, the largest seafood importing country in the world appears largely to have overcome challenges associated with COVID-19, and there are a number of seafood sectors around the world that have been able to maintain their supply to the U.S. and most likely to most other markets given the absence of strong price movements. The limited effect on many seafood prices strongly suggestst that the global market has coped well. As such, while Gephart et al. (2016) is correct in that international trade may spread some types of shocks in a globalized seafood market, our results indicate that the global market can also mitigate other types of shocks. Hence, an important lesson from the shocks created by COVID-19 measures is that global seafood markets and the supply chains that are serving them are highly resilient.

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6 In fact, it has been suggested that if there is any potential for exploiting market power in these supply chains, this is potential buyer power if the U.S. government is willing to coordinate buyer behavior (Fang and Asche 2021). This has been suggested to reduce the environmental impact of seafood production in countries that the U.S. imports from.

7 However, the increase has been larger in earlier years in relative terms as in 2012.

Appendix A

Table A1: HHs for suppliers of US seafood imports by volume and value shares.

	HHI – quantity						HHI – value					
Product name	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Shrimp, peeled frozen	0.21	0.27	0.32	0.41	0.34	0.37	0.22	0.28	0.31	0.40	0.33	0.35
Salmon, Atlantic, fresh fillets farmed	0.53	0.56	0.61	0.60	0.62	0.57	0.52	0.54	0.56	0.56	0.54	0.54
Salmon, Atlantic, fresh farmed	0.54	0.41	0.38	0.35	0.38	0.38	0.50	0.39	0.35	0.32	0.35	0.34
Shrimp, frozen other prep.	0.26	0.22	0.22	0.25	0.26	0.26	0.26	0.23	0.22	0.24	0.26	0.26
Tilapia, frozen fillets	0.80	0.82	0.83	0.74	0.80	0.78	0.70	0.73	0.74	0.58	0.64	0.61
Pangasius, frozen fillets	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Salmon, Atlantic, frozen fillet	0.57	0.54	0.54	0.47	0.45	0.44	0.52	0.52	0.51	0.46	0.42	0.41
Tuna, canned	0.43	0.46	0.54	0.55	0.61	0.49	0.41	0.44	0.54	0.53	0.61	0.51
Shrimp, frozen breaded	0.37	0.38	0.40	0.25	0.21	0.24	0.31	0.32	0.32	0.23	0.22	0.24
Snow crab, frozen	0.60	0.66	0.56	0.56	0.50	0.49	0.67	0.71	0.61	0.61	0.48	0.50
Shrimp, frozen, shell-on 21/25 count	0.28	0.35	0.33	0.38	0.26	0.24	0.27	0.33	0.29	0.35	0.26	0.23
Crab meat, canned	0.32	0.27	0.28	0.30	0.38	0.30	0.31	0.30	0.30	0.30	0.37	0.33
Lobster, frozen	0.98	0.99	0.99	0.99	0.99	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Lobster, frozen meat	0.99	0.98	0.98	0.96	1.00	0.99	1.00	0.99	0.99	0.97	1.00	0.99

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