Reviewer Response

We appreciate the time and attention that all three reviewers contributed to providing constructive feedback on our submission. The following document outlines the changes that have been made in response to this feedback. In cases of conflicting feedback, we have outlined the response that was adopted in our revised submission.

In response to feedback from all reviewers and the editor, regarding the inclusion of recent COVID literature we have revised the introduction to provide greater discussion of the literature published early on in the COVID-19 pandemic, particularly in the introduction of the paper. This discussion supports the framing of the article as an exploration of the impacts and concerns about the impacts of the pandemic on the fishery sector, with the advantage of price data from the markets explored. The following outlines responses to the reviewers' critiques.

Reviewer 1 Feedback and Responses

1.   The main purpose of the paper is summarized on lines 138-139: "We see to understand how markets responded to the economic shock and whether the responses was uniform around the world." This may be a valid question, but it has arguably been asked (and interrogated) multiple times using a diverse set of data from around the world (see: Love et al. 2021 and subsequent research). As such, it seems that the analysis presented in this paper complements and confirms other previous research, as opposed to providing a major synthesis or new approach.

Response: In response to the concern raised about the contribution of the paper to the existing body of literature around the impact of the COVID-19 pandemic on fisheries, we suggest that the revised framing of the paper (line 147-160) more adequately highlights the value of this work. The novelty of this paper lies in assessing the findings from early pandemic research and the assumptions that were necessary in the early months of the pandemic through incorporating fish price data from around the world. Early pandemic research relied heavily on anecdotal reports and what data was available at the time. With the benefit of time and additional data availability we are able to return to the findings of these earlier papers to assess whether the expected impacts were realized.

2.   The framing of this paper could be strengthened. In particular, it was not clear to me why the authors would focus on whether or not responses to COVID-19 would be uniform around the world. What evidence from prior shocks suggest this is a likely outcome? Wouldn't we expect heterogenous responses based on species and geography, given the complexity of seafood systems? Work by Gephart, Cottrell, and others have pointed to regional differences to shocks in fisheries and food systems. Perhaps a more pressing question is WHY these differences arise and WHAT factors lead to more/less rapid recovery. The authors touch on this in the results, starting on line 220, but ultimately conclude "a look at prices alone cannot reveal the root causes of [differences]" (ln 486). [Note: I agree with this point, but would suggest that other research methods could be used to get at these root causes and would be necessary in order to go from a largely descriptive paper to one that is more analytical in nature].

Response: The framing of the paper has been clarified to focus on impacts and concerns discussed in early pandemic literature, rather than focusing on the expected economic response to the pandemic impacts (line 147-160). We have also further developed the paper to discuss the cause of different impacts more thoroughly.

3.   A third (and a much more minor point) is that this paper would be strengthened by a more extensive review of the COVID-19 / fisheries literature that has already been published. The authors appear to rely particularly heavily on Smith et al. 2020, which is a great paper, but there is a rapidly growing body of literature that could be used throughout the paper to help frame the research and [sic].

Response: We have further developed the introduction to include more of the early pandemic literature around COVID-19's impact on the fishery sector.

Reviewer 2 Feedback and Responses

There are many ways to analyze time series data. Did the authors consider using correlation statistics and reporting a rho value for pre-2020 vs 2020 data? Just thinking of other options.
Response: We tried to analyze the time series using a variety of approaches. Starting with simple t.tests from pre- and post-collapse to detect whether prices overall had been different. We also tried correlations by matching each week to the value of 2020 or the average for the 5 years of data. Both of these methods faced 2 issues: (1) the changes in prices were not uniform, thus while some weeks clearly experienced a collapse, others didn't. This means that both the t.test and the correlations couldn't capture the temporal dynamics appropriately. (2) There was no way to test for the significance of a price collapse in a given week. This led us to our current methodology of testing collapses every week by using the 95% confidence intervals.

L413-425. Consider including the limitations within the methods section
Response: This feedback conflicts with another reviewer's comments. The other reviewer's suggestion to move the limitations to the discussion and draw the connection to further research was incorporated into the paper. We have adopted this recommendation.

Did the authors try different SE values before settling on 1.96? I am curious how this choice might influence the findings.
Response: This section has been revised to include a more thorough explanation of the analysis employed as well as the justification for the methods chosen (line 181-202).

Were any aquaculture products sold at these markets?
Response: The production method was not specified across or within markets.

Table 1. What does price data "frequent" mean?
Response: "Frequent" was a term that was used by the markets. It is our understanding that this is likely a mean value.

Figure 2. I am a little confused about what this plot is presenting?
Please label the x-axis and define the headers with parts A, B, C, etc. In the figure legend please refer to each part of the figure.
Response: Additional labels have been added to clarify the figure.

Supporting Figures 1-5. I would like to see these moved to the paper.   I think the current Figure 1 can probably be moved to a supporting figure.
Response: We have increased the reference to the supporting figures, however given the volume of data for each market we feel that it is best to keep these figures as supplementary materials. Figure 1 of

the original manuscript has been removed at the suggestion of another reviewer.

Reviewer 3 Feedback and Responses

I think it would be valuable to provide more context in the introduction to how fisheries and seafood experience various shocks. This would provide more generality than simply a paper focused on COVID. The first paragraph could be expanded, and citations could be added.
- There has also been a lot more work done on COVID and seafood then what is currently
Response: The introduction and framing of the paper has been revised to include more insight into the anticipated shocks to the fishery sector, as a result of the COVID-19 pandemic. As highlighted in the introduction, the COVID-19 pandemic is a unique example of a shock that permeates all aspects of our lives, unlike shocks that are distinctly economic, environmental or social in nature. This presents some additional complications when attempting to apply other shock related literature to the impacts of the COVID-19 pandemic.

- A key part of the methods is the definition of a "price anomaly". I think it is important to provide more context on why 1.96 standard errors (i.e., the 95% confidence interval) is appropriate here. I'm not saying it is a bad measure, but no motivation was provided to why it was the correct measure. What does past literature say about the detection of anomalies?
Response: Further explanation of the methodology has been incorporated to clarify the justification for the chosen methods (line 181-202).

- I don't think figure 1 is very helpful in the current manuscript. Unless the number of cases is used in relation to understanding fish prices, I would remove it.
Response: Figure 1 of the original manuscript has been removed.

- For each country's profile (in particular Japan) in the results, there were few citations given for COVID lockdowns, outbreaks, or other context (typically all of this is in the first paragraph). It would be helpful to base this on past literature available for these countries.
Response: Additional citations have been included in the descriptions of the markets.

- Starting on line 430, the authors begin to describe the possible explanations of what is driving these patterns. I would like to see more analyses or focus on this specific topic. It is nice to observe changes in prices over time, but the mechanisms, or at least correlates, are particularly interesting. It would be helpful to see what the timing of price anomalies correlates with, such as COVID lockdown measures, COVID cases, environmental factors, etc. I think this would greatly improve the overall value of the paper but would involve several more analyses. The analyses around fresh or frozen are the only ones along these lines currently.
Response: We attempted several different types of analysis to understand the trends in change to prices across the markets. While we agree that a more in-depth exploration of each market would be interesting, it is complicated by heterogeneity in COVID precautions and what term such as "lockdown", "stay at home" and other terms mean, the jurisdiction that has the authority to make these decisions in the nation/region/municipality where the markets are located and other factors. We believe this is an interesting subject for further study, but beyond the scope of what we seek to accomplish in this paper.

- Please reference figures/tables in the discussion so readers know where to find the

evidence for the author's claims
Response: Additional references to table and figures have been incorporated into the body of the paper.

- The "Limitations" paragraph felt out of place. I would expand on this section after it is moved to the discussion. I would frame it more in the direction of how future work could build on this paper.
- The discussion does not really propose future work that could be done to build on this paper.
Response: We have adopted the recommendation to move the Limitations section into the Discussion and develop it further to support a more in-depth discussion of future work to be done.

- In the abstract and recommendations sections, the authors note that we (scientists or policymakers?) need to develop a "dynamic understanding of the respective supply chains". What does this actually mean? How would this feasibly be accomplished? Similarly, it feels strange on line 520 to say decision makers should do something. It sounds like this is a job for more research by scientists that decision makers could then use this model/map/network in their decision making. Decision makers don't develop these kinds of products.
Response: We have expanded our discussion (beginning on line 445) on the need for real-time monitoring that would allow for a dynamic understanding of how the supply chain responds to shocks, in particular in light of the rapid speed observed for COVID-19 impacts. While we agree that the role of researchers and scientists would be to identify drivers and trends, government agencies have a role to play in monitoring and real-time assessment. By "decision makers" we intended to refer to government agencies tasked with monitoring and evaluation such as fisheries agencies and department of commerce, rather than politicians.

o The supplemental figures displaying price data over time for each species and market seemed the most useful in understanding the temporal dynamics. Is there some way to include a subset of these in the main text?
Response: We have increased the reference to the supporting figures, however given the volume of data for each market we feel that it is best to keep these figures as supplementary materials. Figure 1 of the original manuscript has been removed at the suggestion of another reviewer.

o It might be useful to consider alternative colors for figures 1,3,4 that allow for grayscale printing. Figure 1 is also not color-blind friendly.
Response: These figures have been adjusted to greyscale to allow for greyscale printing and be colour-blind friendly.