More than Meets the Eye: Consumers’ Willingness to Pay for Marine Stewardship Council’s Certified Seafood

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Abstract

The Marine Stewardship Council (MSC) certificate provides great promise as a market-based tool for sustainable fisheries but to succeed in the market a critical share of producers needs to participate in the program. Since consumers’ willingness to pay is a driver of producer participation, we conduct a consumer choice experiment to determine U.S. American consumers’ preferences and willingness to pay for MSC certification for canned tuna. We find that most U.S. American consumers are willing to pay for MSC-certified seafood. Also, results show that MSC certification might be especially advantageous for exporting producers from developing countries. Finally, our modeling allows us to determine complementary effects that MSC might have with other attributes. The results provide insights to stakeholders in the seafood industry on the effectiveness of MSC certification in championing sustainable fisheries. Recommendations based on willingness to pay for sustainable seafood labeled with MSC are provided.

Key Words: Marine Stewardship Council, Sustainability, Willingness to Pay, Seafood

JEL Classification: Q11, Q13, Q18

Introduction

Fish stock depletion is one of the most challenging ecological crises in the world. The FAO announced that over 90% of fish stock is fully exploited or overexploited (FAO, 2014). This dire situation highlights the need for a systematic and broad-based approach that will ensure the sustainability of the fish stock. One of possible approaches is the use of “Ecolabels”. In essence, the usefulness of ecolabels is contingent on its ability to create market differentiation. Ecolabels can kill two birds with one stone. Unlike prices and other search attributes, environmental attributes related to a product’s production are often impossible for the individual consumer to assess (Caswell and Mojuszka, 1996, Wessells, et al., 1999). Ecolabels could address the information gap that is inherent in “sustainability” related attributes (i.e., as a credence attribute),
making it possible for consumers to differentiate between sustainable and conventional products. With the provision of ecolabels, consumers could then make informed purchase decisions depending on their preferences and willingness to pay (WTP) for sustainable products. Moreover, if consumers are willing to pay a higher price for an eco-labeled product, then this could serve as a signal to producers and could then motivate them to participate in sustainable production practices with the potential of price premium, greater market share, or in some cases, the eligibility to make it to retailers’ shelf.

The number of consumers demanding guilt-free seafood are on the rise, so are the number of sustainable fisheries certifier (Christian et al. 2013). The most established certifier in the fishery industry is the Marine Stewardship Council (MSC). Founded by WWF and Unilever in 1997, the MSC sets and maintains standards for sustainable fishing and seafood traceability. This NGO has rapidly become the biggest seafood certifier, with 255 fisheries now MSC certified accounting for 11 million metric tons or 12% of the annual global harvest of seafood (Marine Stewardship Council, 2015). Diamond (2005) contends that the MSC is a good example of collaboration between environmental effort and business interest in promoting sustainability.

Nevertheless, Stokstad (2011) highlighted that MSC has not yet won over the skeptics of the certifiers’ positive impact on sustainability. While MSC has assumed the leadership in the fishery certification business, whether consumers recognize and are willing to pay for its label remains an open debate. For example, concerns were raised that MSC’s standard is not sufficiently stringent, pointing to incidences where MSC has allowed certification of declining fish stocks and fish stocks that require more scientific studies to assess their sustainability status. In addition, MSC has a low rate of certification amongst fisheries in small-scale fisheries, especially those in developing countries where environmental enforcement is typically weaker than in developed countries (Jacquet, et al., 2010).

Given the debate about the MSC label, it would then be important to know if consumers are convinced about the effectiveness of MSC in achieving its goal in sustainability. Despite the belief that consumers prefer sustainably-produced food products, recent evidence suggests that ecolabels do not always induce favorable consumer preference (Delmas and Lessem, 2014). Among others, trust is a significant factor in consumer preference of sustainable products and of fundamental
importance (Wessells, et al., 1999). Consumers have to trust MSC’s visions and its ability to achieve those visions in order to be willing to pay for the certificate. In addition to trust towards the certifying agency, existing literature shows that consumers’ attitudes and certain demographic factors can influence the preference for sustainably produced seafood (Brécard, et al., 2009, Wessells, et al., 1999). For example, Jaffry, et al. (2004) find that consumers in the UK prefer sustainability certified products. Roheim, et al. (2011) detected a price premium for the MSC label using a hedonic price model in the Metropolitan London market. Johnston, et al. (2001) highlighted that the preference is heterogeneous across geopolitical boundaries.

Evidence of strong consumer acceptance may hold the key to increase producers’ participation in the sustainable practice, especially given that the cost of obtaining MSC certification range from $10,000 for small scale fisheries to $500,000 for larger and more complex fisheries (Roheim, 2003, Washington, 2008). Washington (2008) further points out that the lack of in-depth analysis showing a higher willingness to pay for ecolabels may have detrimental effects to participation of fisheries in developing countries.

There is scant literature however on US consumers’ WTP for sustainably produced seafood. In addition, most existing literature merely provides a rather static average WTP, omitting the potential for heterogeneity in the valuation estimates and hence, also the assessment of the fraction of the market willing to pay for sustainably produced seafood. Moreover, the literature is relatively scarce on the joint effects that MSC certification might have with other categories of attributes when they are presented together. Louviere, et al. (2000) exhort that the interaction effects could account for a significant portion of decision makers’ choice. For instance, MSC certificates may mitigate the negative connotation associated with imported seafood from developing countries due to poorer environmental standard and practice that are often linked to these countries. MSC certification could also have substitution effect that could crowd out WTP for other attributes (Gao and Schroeder, 2009).

1. To fill this void in the literature, in our study, we will estimate consumers’ WTP for sustainable seafood and also address taste heterogeneity and the relationships between ecolabelling, country of origin labeling and health claims. The main goals of this study are:
To determine willingness to pay for sustainably produced seafood amongst American consumers.

2. To quantify the share of American consumers willing to pay a premium for sustainably produced seafood.

3. To evaluate the presence of complementary or substitution effects that MSC certification might have with other seafood attributes.

Our results using an online consumer choice experiment study suggest that US consumers generally exhibit a heterogeneous willingness to pay for sustainable seafood. In addition, we observe that sustainability could complement Country of Origin labeling on imported products and some health claims.

Methodology

Design of the Study

The data of this study is collected via an online survey. Survey development involved literature review, consultation with experts, and pretesting. In the online choice experiments, 1039 canned tuna consumers from the US participated. The sample was stratified based on education, gender, and age of the American population so that the preferences determined are representative of American canned tuna consumers.

While the main goal of this study is to assess consumer willingness to pay for MSC certified seafood, we included other attributes to avoid single cue bias (Bilkey and Nes, 1982). As noted, the MSC certification was used to represent sustainable practice as it is the largest seafood labeling program of its kind. Second, the country of origin attribute was included (unspecified, USA, Ecuador, Vietnam). Third, a label was used to indicate if the can lining material is free of Bisphenol-A, a controversial plastic packaging material that is linked to obesity, endocrine disruption, and other health concerns (Bhandari, et al., 2013, Munguia-Lopez, et al., 2005, Takeuchi, et al., 2004, Yoshida, et al., 2001). Fourth, a heart-healthy label, which is used to highlight food that meets certain nutritional requirements that promote heart health was included (present or absent). Lastly, the price was included based on market prices of canned tuna in the U.S.
The product attributes and their levels were used in a choice experiment to measure consumers’ willingness to pay. To design the choice experiment, we used Bayesian D-Optimality Criteria to construct the choice sets. This avoids efficiency-reducing dominant choice sets (Crabbe and Vandebroek, 2012). The design had a D-Efficiency score of 88.40%. The choice experiment consisted of a total of 24 choice sets. To minimize potential respondent fatigue, the choice sets were distributed into four blocks, and each respondent was presented with six choice sets (Savage and Waldman, 2008). Each choice set featured two five ounces canned tuna options incorporating various combinations of the attributes. Each choice set also includes an opt-out option, which allows the respondents the option of not buying if the two given canned tuna choices do not represent an appealing option for purchase (Hensher, et al., 2005, Louviere, et al., 2000).

**Econometric Model**

The decision process for choice of canned tuna can be represented by a random utility model. The utility of Individual decision maker i, associated with alternative j in choice set t is given as:

$$U_{ijt} = \beta'x_{ijt} + \gamma p_{ijt} + \delta'z_{ijt} + \varepsilon_{ijt} \quad (1)$$

The parameters to be estimated are $\beta$, $\gamma$, and $\delta$. The vector $x_{ijt}$ depicts non-price main-level attributes presented in the alternative j of choice set t. Following the specification of the mixed logit model, the parameter vector $\beta$ accounts for the part worth of utility associated with the attributes, and is assumed to follow a given distribution $f(\beta)$; thus, the model also produces estimates for standard deviations of the random parameters, $\lambda$. The price attribute, $p$, is assumed to be fix to avoid distribution of the price parameter around zero for a more realistic distribution of willingness to pay. The mixed logit model enables accounting for taste heterogeneity, which could provide a more realistic representation of the distribution of taste as preference of attributes in food is often found to be heterogeneous. Vector $z$ represents the interaction terms of MSC and none price attributes. The stochastic error term $\varepsilon_{ijt}$ is assumed to follow type I extreme value distribution (Train, 2003).
Results

The final model records a McFadden Pseudo R-squared score of 0.3186 (see table 1). The AIC criterion suggests that the mixed logit specification significantly improves upon a counterpart model estimated with a conditional logit specification where all parameters in equation (1) were assumed as non-random. All of the estimated standard deviation of the random parameters are significant and lend credence to the presence of taste heterogeneity among the examined attributes. The statistically significant and negative price parameter conforms to the standard theory, which suggests that higher price reduces the likelihood of purchase.

Preference and Willingness to Pay for MSC Certification

Of main interest in our study are the parameters associated with MSC. The significant and positive main level parameter suggests that consumers prefer canned tuna furnished with the MSC label. The standard deviation associated with MSC points to the existence of taste heterogeneity in regards to MSC-labelled seafood. Our estimates suggest that about three quarter of the respondents show preference for MSC-labelled canned tuna (table 1), which is in line with Johnston, et al. (2001) who observed that 80% of Americans are willing to pay for sustainably-produced salmon.

Assuming that the price per can of five ounces of tuna is $2.00, our results suggest that consumers are willing to pay a sizeable amount for sustainably produced canned tuna. The willingness to pay for MSC-labelled tuna is estimated to have a mean value of $0.58 per can, and $1.55 per can at the 90th percentile (table 2). The willingness to pay estimates agree generally with findings from previous studies. While it appears to be higher than the 14.2% mean premium reported in Roheim, et al. (2011), the discrepancy could stem from difference of measurement between market premium and willingness to pay.

The finding of the sizeable willingness to pay supports the notion that US consumers prefer MSC-labelled seafood products. This is important given that policy-makers and others have raised doubts regarding the effectiveness of MSC as a tool to support the market condition for sustainable seafood market (Roheim, et al., 2011). This finding suggest that US consumers intend to support sustainably produced seafood, and it may lend credence that regardless of how consumers may...
associate the MSC label to the actual production, they express trust towards the products that bear the MSC label.

The negative coefficients associated with imported products, $\beta_{\text{vietnam}}$ and $\beta_{\text{ecuador}}$, suggest that US consumers view imported canned tuna unfavorably even when comparing against similar products that are not labeled with origin; conversely, consumers prefer domestic products (origin USA) over an unlabeled product. These results are hardly surprising given that studies have repeatedly shown that US consumers prefer US products over imports (Lim, et al., 2013, Tonsor, et al., 2009), and favor labelled US products over unlabeled products (Loureiro and Umberger, 2007). In relation to the MSC certificate, the question arises as to whether the certificate improves the negative connotation that Americans displayed towards imported seafood.

Judging from the term, $\gamma_{\text{msc*Ecuador}}$, the test rejects the null hypothesis that the interaction effects between MSC and country of origins does not exist. MSC might show positive interaction effects for imported product. To illustrate, the average consumer has a negative willingness to pay of $-0.85 for a can of Ecuadorian tuna compared to a similar can of tuna not labeled for Country of Origin. Nevertheless, when Ecuadorian canned tuna is offered with the MSC label, the MSC label increases willingness to pay by on average $1.14 per can from the main ($0.56) and interaction effect ($0.58) of having the MSC certification.

The interaction effects of sustainable production and health claims are mixed. From the main effects, the estimates suggest that consumers prefer BPA-free and Heart-healthy claims. When BPA-free is offered in addition to MSC certification, we observe a complementary effect. The mean willingness to pay increases by $0.47 per can when BPA-free is offered with MSC certification. This complementary effect suggests that MSC labelling could strengthen the positive image of certain claims.

Nevertheless, the interaction terms between the Heart-healthy claim and MSC certification is negative; this suggests that MSC is a gross substitute to the Heart-healthy claim. The data provide no direct explanation as to why the relationship between the two attributes exists. The two attributes however could be net substitutes, i.e., consumers could perceive the two attributes serving overlapping purposes, thus offering one attribute over the other does not lead to simple
addition of their associated values. We could also postulate that while the two attributes are not necessarily net substitute, it is possible that the income effect exerts downward pressure on utility. In other words, as the number of attributes offered increases, consumers accommodate the budget constraint by cutting back expenditure especially on those attributes that have large main effects, such as the Heart-healthy claims; thus the two attributes could be net complements, but gross substitutes (Nicholson and Snyder, 2011).

**Conclusion**

The MSC certificate provides considerable promise as a market-based tool for sustainable fisheries. To succeed as a long-term solution, however, it must receive a critical mass of participation from producers (Roheim, et al., 2011, Wessells, et al., 1999). For this to happen, consumers’ willingness to pay is a necessary condition for market premium or wider market access. The existing literature provides limited information about consumers’ willingness to pay for sustainable fishery products. Our results suggest that most US consumers are willing to pay for MSC-certified seafood, and that the amount they are willing to pay is substantial, especially in the higher percentile. Additionally, we found that MSC certification might be especially advantageous for exporting producers from developing countries as our model demonstrated a complementary effect, which will help alleviate the negative image commonly associated with imported products.

This article shows consumers’ taste variation to MSC-labelled products, and is possibly the first to point out complementary effects that MSC might have with other attributes. Nevertheless, the scope of this research is limited to the US population and canned products. The results are unlikely to be fully generalizable to other markets and products. Even though the marginal willingness to pay estimates are believed to be robust (Lusk and Schroeder, 2004), as with all stated preference studies, the results are contingent upon the accuracy of the data obtained from stated preference methods involving hypothetical choice scenarios. Nevertheless, our analysis serves as a reasonable starting point for further discussion on the effectiveness of MSC in championing sustainable fisheries.

**Reference**


Marine Stewardship Council (2015) "MSC in numbers." In.


Table 1. Mixed Logit Model Estimates

<table>
<thead>
<tr>
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<td><strong>Random Coeff.</strong></td>
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<tr>
<td>$\beta_{opt\ out}$</td>
<td>-4.7345</td>
<td>*** 0.2734</td>
<td>$\lambda_{opt\ out}$</td>
<td>4.2017</td>
<td>*** 0.2308</td>
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<td>$\beta_{usa}$</td>
<td>1.0683</td>
<td>*** 0.1588</td>
<td>$\lambda_{usa}$</td>
<td>1.1889</td>
<td>*** 0.1622</td>
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<tr>
<td>$\beta_{vietnam}$</td>
<td>-0.7673</td>
<td>*** 0.1963</td>
<td>$\lambda_{vietnam}$</td>
<td>1.7249</td>
<td>*** 0.1698</td>
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<tr>
<td>$\beta_{ecuador}$</td>
<td>-1.2743</td>
<td>*** 0.2210</td>
<td>$\lambda_{ecuador}$</td>
<td>1.5300</td>
<td>*** 0.1730</td>
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<tr>
<td>$\beta_{bpafree}$</td>
<td>0.2948</td>
<td>** 0.1394</td>
<td>$\lambda_{bpafree}$</td>
<td>1.0914</td>
<td>*** 0.1029</td>
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<tr>
<td>$\beta_{msc}$</td>
<td>0.8655</td>
<td>*** 0.2530</td>
<td>$\lambda_{msc}$</td>
<td>1.1422</td>
<td>*** 0.1122</td>
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<tr>
<td>$\beta_{heart-healthy}$</td>
<td>1.7122</td>
<td>*** 0.1732</td>
<td>$\lambda_{heart-healthy}$</td>
<td>1.1116</td>
<td>*** 0.1135</td>
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<tr>
<td><strong>Non-random Coefficients</strong></td>
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<td></td>
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<tr>
<td>$\gamma_{price}$</td>
<td>-1.5048</td>
<td>*** 0.0780</td>
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<tr>
<td>$\delta_{msc*usa}$</td>
<td>0.2412</td>
<td>0.2629</td>
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<tr>
<td>$\delta_{msc*viet}$</td>
<td>0.1089</td>
<td>0.2727</td>
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<tr>
<td>$\delta_{msc*ecu}$</td>
<td>0.8415</td>
<td>*** 0.2875</td>
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<tr>
<td>$\delta_{msc*bpafree}$</td>
<td>0.7094</td>
<td>*** 0.2256</td>
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<td>$\delta_{msc*heart-healthy}$</td>
<td>-1.0409</td>
<td>*** 0.2575</td>
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<tr>
<td>Log likelihood score</td>
<td>-4639.62</td>
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<tr>
<td>AIC</td>
<td>9319.20</td>
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<tr>
<td>McFadden R-squared</td>
<td>0.3186</td>
<td></td>
<td></td>
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</table>

*, **, *** denotes significant at the 90%, 95%, and 99% significance levels respectively.

The log likelihood score of a conditional logit model is -5996.56, and the AIC is 12019.1.
Table 2. Willingness to Pay Estimates

<table>
<thead>
<tr>
<th></th>
<th>% of Positively Distributed Region</th>
<th>Mean willingness to pay ($/can)</th>
<th>Willingness to pay at 90th Percentile ($/can)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects</strong></td>
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<tr>
<td>Opt Out</td>
<td>12.99%</td>
<td>-3.1463 **</td>
<td>0.4332</td>
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<tr>
<td>USA</td>
<td>81.56%</td>
<td>0.7100 ***</td>
<td>1.6485</td>
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<tr>
<td>Vietnam</td>
<td>32.82%</td>
<td>-0.5099 ***</td>
<td>0.9204</td>
</tr>
<tr>
<td>Ecuador</td>
<td>20.25%</td>
<td>-0.8468 ***</td>
<td>0.4487</td>
</tr>
<tr>
<td>BPA Free</td>
<td>60.65%</td>
<td>0.1959 **</td>
<td>1.0624</td>
</tr>
<tr>
<td>MSC</td>
<td>77.57%</td>
<td>0.5752 ***</td>
<td>1.5596</td>
</tr>
<tr>
<td>Heart Logo</td>
<td>93.83%</td>
<td>1.1378 ***</td>
<td>2.0768</td>
</tr>
<tr>
<td><strong>Interaction Terms</strong></td>
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</tr>
<tr>
<td>MSC*USA</td>
<td></td>
<td>0.1603</td>
<td></td>
</tr>
<tr>
<td>MSC*Vietnam</td>
<td></td>
<td>0.0724</td>
<td></td>
</tr>
<tr>
<td>MSC*Ecuador</td>
<td></td>
<td>0.5592 ***</td>
<td></td>
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<tr>
<td>MSC*BPA Free</td>
<td></td>
<td>0.4714 ***</td>
<td></td>
</tr>
<tr>
<td>MSC*Heart Healthy</td>
<td></td>
<td>-0.6917 ***</td>
<td></td>
</tr>
</tbody>
</table>

*, **, *** denotes significant at the 90%, 95%, and 99% significance levels respectively based on 1000 Krinsky and Robb Simulation.