Food Policy 44 (2014) 68–76

Contents lists available at ScienceDirect

Food Policy

journal homepage: www.elsevier.com/locate/foodpol

Demand for ecolabeled seafood in the Japanese market: A conjoint analysis of the impact of information and interaction with other labels

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ARTICLE INFO

Article history:
Received 18 September 2012
Received in revised form 30 September 2013
Accepted 19 October 2013

Keywords:
Choice experiment
Consumer preference
Ecolabeled seafood
Japanese market
Multiple attributes interactions

ABSTRACT

The use of seafood ecolabels is expanding in the world marketplace, but so are labels indicating other product attributes, such as country of origin and wild vs. farmed. The interactive effects of these labels and attributes in evaluating consumers' preferences for ecolabeled seafood are relatively unexplored. In this paper we investigate (1) the direct and interactive effects of seafood ecolabels with other common fish labels, and (2) how consumers' perceptions about the state of marine stocks and the valuation of ecolabels may be affected by different information. We find moderate interactive effects between ecolabels and country of origin labels, whereas the valuation for seafood ecolabels is fairly high. In terms of information, we find that consumers' perceptions about fish stock levels changed (negatively) after receiving information on declining stock levels, and more sensationalized information led to increased change. However, valuation for a seafood ecolabel increases only when the information was perceived positively (credible/interesting); whereas exaggerated information (which was also perceived less credible) had insignificant effects on WTP.

Introduction

Ecolabeling is widely used in today's marketplace to help consumers identify environmentally friendly products among the large array of products offered. The ultimate goal of implementing ecolabeling is to achieve an overall improvement in environmental quality by creating market-based incentives for producers and others in the supply chain to adopt environmentally friendly practices. Regarding seafood products, the main environmental objective is to protect the marine ecosystem by supporting sustainable fishery management. Examples of existing programs and labels include Friends of the Sea, KRAV (Sweden), Label Rouge (France), Marine Eco-Label Japan, and the most well-known Marine Stewardship Council's MSC label.

Previous studies that investigated preferences for ecolabeled seafood have shown that consumers generally have favorable views toward it. Studies from the late 1990s and early 2000s showed that US consumers preferred ecolabeled seafood products as long as the price premiums were sufficiently small (Johnston et al., 2001; Wessells et al., 1999). Johnston et al. (2001) compared consumers' preferences for ecolabeled seafood in the United States and Norway. While consumers in both countries preferred ecolabeled seafood, there were significant heterogeneities in the details of their preferences. In more recent studies on European consumers, studies found that consumers with a certain profile showed significant demand for seafood ecolabels (e.g., Brécard et al., 2009; Salladarré et al., 2010).

It is important to recognize, however, that ecolabels signal just one of many attributes that a product possesses. As such, the effect of ecolabels on consumers' overall valuation of a product and ultimately purchase decision must be investigated in a broader context. Consumers may use commonly observed product characteristics, such as fish species, country of origin, and whether the fish were farmed or wild-caught, to infer an unobserved level of product quality (Jaffry et al., 2004; Johnston and Roheim, 2006; Salladarré et al., 2010). In some countries, such as Japan, labeling the country of origin, whether wild-caught or farmed, and whether fresh or previously frozen is mandatory, either on the package or listed on point-of-purchase signage. Ecolabels are therefore evaluated together with these other labels in retail settings.

In addition to the fact that consumers may consider relative importance of various attributes and evaluate the overall desirability of the product, product labels may also have interactive effects. In the context of consumers' choice of fresh produce, Onozaka and Thilmany McFadden (2011) found fair trade labels associated with

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0306-9192/$ - see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.foodpol.2013.10.002

Chile (apples) and Mexico (tomatoes) are evaluated higher than those procured from US domestic sources (but not locally grown). They speculate that this is because consumers perceived higher net social gain when a fair trade principal is applied to produce from less developed countries (Onozaka and Thilmany McFadden, 2011). Brécard et al. (2012) also looked at the interactions of ecolabels, fair trade, and health labels on seafood in France and found that consumers who favor ecolabels also tend to favor fair trade labels.

An interesting twist in the context of seafood products is that consumers' valuations of ecolabels may differ depending on other fish characteristics. For example, they may place a different value on sustainable fishery practices by familiar domestic fisheries than those by unfamiliar foreign ones. Perceptions toward wild-caught and farmed fish may also play a role (e.g., Roheim et al., 2012); if a consumer perceives wild-capture fishing as more damaging to fish stocks, the value of an ecolabel applied to wild-caught fish could be greater than one applied to farmed fish. On the other hand, if fish farming is perceived as more damaging to the environment, an ecolabel on farmed fish could be of greater value. These interactions may have implications for policy and marketing because aquaculture has been increasing its share of overall seafood production (FAO, 2010), and the aquaculture industry has been keen to address sustainability criteria (e.g., Global Aquaculture Alliance's Best Aquaculture Practices certification program). In sum, consumers face complex trade-offs when multiple labels are presented simultaneously. To the best of our knowledge, such interactive effects from labels on demand for seafood products have not been rigorously explored to date.[1]

Another key issue regarding seafood ecolabels is consumer awareness. If a consumer perceives that the current situation of marine stock and fish resource management is good, then assurance of better resource management by adding an ecolabeling scheme may not provide any additional value. For example, Hicks et al. (2008) found that only 48% of their US survey respondents agreed that "overfishing is a problem;" thus 'ecolabeled seafood' ranked last among the seafood purchasing criteria. Brécard et al. (2009) found that consumers in five European countries who perceived that the status of fish stocks were fine were less likely to demand fish harvested with an eco-friendly technique, which they call the "crowding out of intrinsic motivation."[2] Onozaka et al. (2010) found that many Japanese consumers were unaware of the dire status of stocks for certain and common fish species since they often do not observe any signs in the market, as depleted species get replaced by farmed or similar, but more abundant, species. Thus, the insignificant impact of seafood ecolabels in the Japanese market may partly be due to the fact that Japanese consumers have very little knowledge about the state of world fisheries and, consequently, did not recognize the need for ecolabeled seafood products.

An interesting question, therefore, is *what kind* of information may alter consumers' awareness of the need for sustainable fisheries? For this purpose we used two sources: a report published by United Nations Food and Agriculture Organization (FAO) and a study by Worm and colleagues published *Science*. They are arguably the most cited sources with essentially the same message: the status of global fish stocks is poor. However, they deliver the message in a very different tone: the FAO report, *The State of World Fisheries and Aquaculture 2006* (FAO, 2007), simply states that one quarter of fish species are either overfished or endangered. On the other hand, Worm et al. (2006), and subsequent coverage of their article by *The New York Times* (Dean, 2006), included a sensational prediction that commercial fisheries will collapse in 40 years if the current level of overfishing continues. It would be of interest to seafood industry, NGOs, and government regulators to know which of the two highly cited sources, but with different tones, is (1) more convincing for consumers, such that it alters their awareness, and (2) to what extent that can affect the valuation of ecolabeled seafood products.

In this study, we investigate consumers' preferences for seafood ecolabels by explicitly taking multiple labels and information effects into consideration. We employ a conjoint choice experiment designed to investigate the direct and interactive effects of a seafood ecolabel and other commonly observed labels (country of origin, wild vs. farmed, and price). We also provide consumers with one of three different types of information treatments and investigate the differences in the resulting purchase decisions and willingness-to-pay (WTP) for the seafood ecolabels. The sample we analyze is derived from an on-line survey of Japanese consumers. We chose to explore these issues in the Japanese market for several reasons. First, shifts in Japanese seafood demand can have a significant impact on the global seafood market, given Japan's 30% share of all seafood imports and highest seafood consumption per capita globally (FAO, 2009). Second, because of Japan's high levels of seafood demand and consumption, Japanese consumers' preferences should be sufficiently sophisticated to allow us to solicit and measure them for various product attributes.

Consumer survey and instrument design

Data for this study were collected in March 2009 through a nationwide online survey administered by Nikkei Research Inc., a third-party contractor based in Tokyo, using its consumer panel database. The survey questionnaire was developed and revised based on input from focus group sessions and pretests. A total of 18,602 consumers across the country were solicited, and we obtained 3370 usable responses.[3]

Information treatments

Previous studies have shown that information, whether a consumer's prior belief or that acquired during the experiment, matters when eliciting an individual's preference (Cameron, 2005; Fox et al., 2002; Lusk et al., 2006; Onozaka et al., 2010). Perhaps the most relevant study is by Lusk et al. (2006), who estimated consumers' WTP for a ban on antibiotic drug use in pork production with three information treatments. They used information from the World Health Organization, the industry, and no information. They found that the welfare impact of a ban depends heavily on consumers' current knowledge about the use of antibiotics in pork production. They suggested that future research should incorporate the respondents' current level of knowledge and that information treatments should be based on that level of knowledge. Our information treatments followed their suggestions.

As discussed earlier, we used two sources of information on the current state of world fish stocks: FAO (2007) and Worm et al. (2006). Our interests are to determine to what extent these information treatments influence consumers' perceptions about the

[1] Salladarré et al. (2010) incorporate product attributes, such as product origin, price, and farm vs. wild in their analysis. However, the survey they utilized (Europêche/ETF, 2008) does not ask these attributes in conjunction with the consumers' demand for seafood ecolabels; rather as simply a seafood purchasing criteria question using the Likert scale. As such, they were only able to look at the correlations between answers to ecolabel and purchasing criteria questions, not directly at the interactions of these attributes.

[2] Brécard et al. (2009), who also uses survey data from Europêche/ETF (2008), does not define what the "eco-friendly harvesting technique" is. The survey question does not define the term either, thus while authors interpret this as a sustainable technique, it is unclear whether that is how the survey respondents interpreted it.

[3] The recruitment used the phrase "Survey about fish consumption" without mentioning ecolabels to avoid any selection bias.