THE EFFECT ON PRODUCT DIFFERENTIATION BY ORIGIN LABELING OF SEAFOOD

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ABSTRACT

Problems with the security of imported foods and with false indications of origin have recently been uncovered in Japan, leading to increased consumer interest in the country or place of origin of foods. The place of origin is an important element when a consumer buys seafood.

This report presents a case study of sea urchin purchase in Japan to test the above situation. It focuses on the competitiveness of Japanese marine products of local marine products and brands, because the former is affected by the latter. Before 2002, Japan had been increasing its imports of sea urchins in the face of declining domestic yield. Since then, the import volume has declined, although domestic production remains low. Yet demand for product from Iwate prefecture, Japan’s second largest producer, hasn’t changed. To find out why, we interviewed processors in and around Iwate; had a questionnaire for residents in the prefectural capital, Morioka; analyzed statistics from Morioka’s central wholesale market; and spoke to the market’s auctioneer. The results show that consumers have a lot of attention to product safety, and local people highly assess the value of local product. We presume that a trusted label of origin promotes both brand recognition and a perception of product safety.

Keywords: trend of marine product demand in Japan, sea urchin, WTP for local marine product, local brand, competitiveness of local fish

INTRODUCTION

Japan has been the world’s largest importer of marine products in excess of the import quantity of USA since 1980, importing huge quantities from all over the world. To ensure top quality, Japanese companies advise exporting countries on aquaculture techniques and processing of marine products.

Consequently, Japanese people eat an enormous variety of marine products, in particular, high-grade products such as sashimi tuna and sashimi prawns. After asset-inflated bubble economy of the late 1980s, imports into Japan increased remarkably. During the late 1990s to the early 2000s, the quantity of imports required to meet demanded (Import volume – Export volume) reached three times the demand of the other main importers (the USA, Germany, Spain, and France) [1]

However, since 2003, Japan’s imports have obviously declined (Fig.1). The first reason is that the consumption expenditure in household declined after the late 1990s [2]. Second, increasing demand in China, the USA, Korea, Spain, France, and Denmark has made it increasingly difficult to buy international marine products. Third, the consumption (edible volume) of fish and shellfish in Japan has decreased since 2002 [3]. Fourth, since approximately 2000, Japanese consumers have been vividly aware of food security because of major problems caused by imported foods, as seen in BSE, dysentery from oysters, residual agrochemicals in vegetables, milk contaminated with chemicals, and Chinese dumplings contaminated with...
chemicals. Yet Japanese production has recently stabilized at a low level (Fig.1), because of international restrictions on pelagic fisheries, the reduction of resources in Japanese coastal fisheries, and the aging of Japanese fishers.

Because of these factors, the quantity demanded for imported marine products has declined, although the quantity demanded for domestic marine products is sustained. In Japan, a domestic-food-oriented pervades consumers, and local production for local consumption is popular.

![Graph](image)

**Fig. 1** Trend of seafood import volume as a proportion of National production. Source: Statistics Japan [3]

However, growing the orientation and the popularity caused a problem. Before 2000, it wasn’t obligatory for producer to indicate the origin of marine products, and the decision was left to the retailer’s judgment. If a processor processed imported fish and shellfish in Japan, the origin of products was the processor’s address in Japan. In the worst case, a processor could mix numerous imported seaweeds with a few domestic seaweeds and sell the product with a famous regional brand name if the processor’s address was in the region.

The law was revised in July 1999, and made it obligatory to indicate the origin. This has made the label one of elements of differentiation of marine products. More recently, the Collective Trademark System was effected in 2006, promoting the differentiation of commodities. Registration under the system is increasing.

This report describes the Japanese labeling of origin of foods in Japan, and reports on the competitiveness of local sea urchins at a local market, in a case of differentiation by origin.

**Labeling of origin of foods in Japan**

The Japanese Quality Labeling Standards System covers both fresh and processed foods. The maximum penalty for selling food labeled with the wrong place of origin is 2 years’ imprisonment or a fine of up to 2 million yen for an unincorporated enterprise, or up to 100
million yen for a corporation. The regulation is translated as below:

It of fresh foods should be labeled “Name of the food” and “Place of origin”. The place of origin of marine products shall be labeled as provided below based on the facts. Where fresh foods of the same kind and of multiple origins are mixed, the place of origin of each of the mentioned fresh food shall be labeled in the descending order by weight, and where fresh foods of different kinds and of multiple origins are assorted, the place of origin of each fresh food shall be labeled in addition to the corresponding names of them [4].

1) Labeling of the name of water area where the product has been produced (hereinafter referred to as “name of water area”) or the name of district (the name of prefecture to which the main fish farm belongs) shall be made for domestic products, while labeling of the country of origin shall be made for imports. Where labeling of the name of water area is difficult, the name of the port where the marine product has been landed or the name of the prefecture to which such port belongs may be labeled.

2) Notwithstanding the provision of 1) above, any domestic product may be labeled with the name of port where the marine product has been landed or the name of the prefecture to which such port belongs in addition to the name of water area, and any imported product may be labeled with the name of water area in addition to the country of origin.

Place of origin of marine products of a main ingredient shall be labeled for processed foods under the coverage as provided below. The main ingredient is a fresh food which has the largest percent by weight and of which weight is no less than 50% in total ingredients [4].

1) “Domestically produced” shall be labeled on domestic products, while “country of origin” shall be labeled on imports. The following names of places may be substituted for labeling as “domestic”:
Name of water area where the product has been produced, collected or caught (hereinafter referred to as “name of water area”); name of port where the product has been landed; or name of prefecture or other generally known name which the port or main fish farm belongs to.

2) Imported marine products may be labeled with the name of water area in addition to the country of origin.

3) Where the main ingredient has no less than two places of origins, the names of places shall be labeled in the descending order by weight in the total ingredients.

4) Where the main ingredient has no less than three places of origins, the names of no less than two places shall be labeled in the descending order by weight in the total ingredients, and the names of other places may be categorized as “others”.

5) Where there are specific reasons, the roughly identified place shall be labeled in accordance with the provisions of 1) to 4) above. In this case, that effect shall be labeled so that consumers are able to recognize the fact.

METHOD

In developed countries, the concept of the country origin against many imported foods has become important for agriculture and fisheries. Statements of origin continue to increase [5], except in fisheries. This report focuses on the origin of sea urchins, which were chosen
because they are produced around the world for export to Japan, they are rarely consumed outside Japan [1], and so the Japanese demand for sea urchins is little influenced by demand in other countries. Furthermore, Japan is the world’s largest importer of sea urchins and the world’s second largest producer behind Chile (1989-2008 average, [1]). This balance is important in discussions of the competitiveness of domestic and imported produce.

The research area was Iwate prefecture, northeast Japan. Iwate is Japan’s second largest producer of sea urchins. We interviewed processors in and around Iwate in person and by a mailed questionnaire, and residents in the prefectural capital, Morioka, by an online questionnaire, analyzed statistics from Morioka central wholesale market; and spoke to the market’s auctioneer. Detailed methods were written in each section.

SEA URCHIN SUPPLY AND DEMAND

In Japan

Sea urchin is eaten mainly as sushi in Japan. It is considered a high-grade marine product, because sushi is considered fine dining.

Until 2002, Japan had been increasing its imports of sea urchins in the face of declining domestic yields (Fig. 2). The imported products created sub-markets such as conveyor-belt sushi and super market takeout sushi. Since then, import volume has declined, although domestic production remain low, and the real price is in gradual decline. Thus, the demand for domestic produce is gradual decline too, although not to the extent of imports.

In Iwate

In contrast to the national trend, the demand for and supply of sea urchin from Iwate have followed different trends. In the 1960s and 1970s, supply was good and the price remained low. Since the 1980s, the catch has been low to moderate, and the price has been moderate to high
(Fig. 3). Thus, demand in Iwate is higher than the national demand. This demand, in Japan’s second-largest-producing region, affects the national demand.

![Graph showing trend of sea urchin demand in Iwate]

Fig. 3 Trend of Sea urchin demand in Iwate. Note: Data are adjusted by CPI (fish and shellfish) and shell equivalent. Source: [6]

COMPETITIVENESS OF LOCAL SEA URCHIN PRODUCTS

Actual production of local sea urchins

Most sea urchins caught in Iwate are sold to marine product processors via Iwate Federation of Fisheries cooperative Associations. The bidder was 61 processors in 2005. We mailed a questionnaire to them to assess the local production and perceive 35 responses (27 companies in Iwate, 4 in Miyagi to the south, and 4 in Aomori to the north; see Fig. 7). The respondents gave their answers as percentages (Figs. 4-6), which we converted to actual numbers by using data from the Federation.

The respondents produced sea urchin bottled in brine (41%), salted sea urchin (33%), canned sea urchin (13%), steamed and roasted sea urchin (11%), retort-packed sea urchin (1%), and fresh sea urchin on a stick (1%). Over three-quarters (76%) was caught in Iwate, only 7% was imported, and the rest come from around Iwate (Fig. 4). The respondents distributed 70% of their products to Iwate, 13% to Aomori, and 9% to Tokyo and surrounding prefectures (Fig. 5). Nearly three-quarters (73%) went to wholesale market, 14% to super market, 10% to direct sales selling, and 3% to restaurants (Fig. 6).

Thus, most sea urchins caught in Iwate are distributed mainly to domestic wholesale markets.
Consumer analyses willingness to pay by place of origin

Morioka city residents were interviewed by online questionnaire in March 2010. The survey included 439 respondents who ate sea urchin and excluded 61 respondents who didn't. To measure willingness to pay (WTP) for sea urchins of different origin used a logistic distribution function. And, these origins were selected top 5 producing areas in Japan.

The probability that a respondent would answer “yes” to an indicated price is:

\[ P(\text{yes}) = P(V_y + \varepsilon > V_n + \varepsilon) \]

where \( V_y + \varepsilon \) is utility function when a respondent buy at an indicated price, \( V_n + \varepsilon \) is when he/she doesn’t. \( \varepsilon \) is error term.
And, $\Delta V, \varepsilon$ define:

$$\Delta V = V_y - V_n: \quad \varepsilon = \varepsilon_y - \varepsilon_n$$

When $\varepsilon$ follows a logistic distribution:

$$P(\text{yes}) = \frac{1}{1 + \exp(-\Delta V)}$$

The log likelihood function is:

$$\ln L = \sum [d \ln P(\text{yes}) + (1-d) \ln(1-P(\text{yes}))]$$

where $d$ is a dummy for $\text{yes}=1/\text{no}=0$.

The parameters are estimated by maximum likelihood estimation.

If $\Delta P = P(\text{yes}) - P(\text{no})$:

Median WTP = $\Delta P = 0$

In Iwate, fresh sea urchins are sold mainly as sea urchin bottled in brine, so the volume of product is not clear among consumers. Because this uncertainty would scatter the WTP responses, respondents were first told that the price of general domestic fresh sea urchin was approximately 1,500 yen/100g. Consequently, the WTP for sea urchins origination in Iwate was 1,319 yen/100g. The number of this WTP remained as a matter to be discussed further because the WTP was cheaper than the price of general domestic products. Although it was presumed that the distance of each prefectural WTP was correct. If this WTP is defined as 100, then the WTP was 97 for Hokkaido sea urchin, 91 for Aomori, 90 for Miyagi, 77 for Nagasaki (Fig. 7).

Fig. 7 WTP prefecture of origin (WTP of Iwate origin = 100). Questionnaire of Morioka city residents in 2010 (n=439).
Respondents were then asked how safe they thought sea urchins of different origins were. They were asked to answer “very safe”, “safe”, “neither safe nor unsafe”, “unsafe”, “very unsafe”, or “I don’t know”. In the two safest categories, Iwate sea urchins scored 95%, Hokkaido 91%, Aomori 86%, Miyagi 79%, and Nagasaki 41%. WTP and the assessment of “very safe” and “safe” were highly correlated ($r = 0.972$). Thus, it is clear that WTP for geographical origin is associated with perception of food safety.

**Transaction volume of sea urchin in local wholesale market**

As the prefectural capital, Morioka city offers a microcosm of sea urchin consumption in Iwate. This section reviews sea urchin trading in Morioka central wholesale market. The transaction volume of sea urchin in the market increased in the 1980s and remained high in the 1990s (Fig. 8). The sea urchins marketed from owners in Tokyo and Kyoto increased in the 1990s. Because neither prefecture owners significant catches, it most of the products must have been imported. The market’s auctioneer confirmed that imports accounted for a large volume in the past.

During the 2000s, transactions decreased and sustained low. On the other hand, transactions of produce from Iwate, Aomori and Miyagi have been increasing. Notably, produce from Aomori and Miyagi makes up for shortages of produce from Iwate (as did produce from Miyagi in the 1980s and produce from Aomori after the 1990s). The net result is that sea urchins caught in and around Iwate have pushed out imported products.

![Fig. 8 Trends of transaction volume of sea urchin in Morioka city central wholesale market. Source: Annual report of Morioka city central wholesale market.](image)

**CONCLUSIONS AND CONSIDERATIONS**

One reason why the residents of Iwate prefer local sea urchins is the perception of safety. This perception is created at the point of sale. Respondents learned which sea urchins are in season at the point of sale, where they decided which product to buy. More than half (52%, Multi-Answer) of respondents decided to purchase at the point of sale, and 42% (Multi-Answer)
decide to purchase because the sea urchins were in season (from April to August in Iwate). Just over half (51%) knew when sea urchins were in season because they saw them on sale every year. Thus, the consumers get some information on the product at the point of sale. Continued sales of sea urchins labeled “local” indicate that consumers are happy with the perceived safety of the produce.

The Iwate processors process mainly local raw material, and sell the products locally. They gave five reasons: the raw material is easy to source; information of a rich/poor catch are easily gathered every day in season; details of catch size and quality are easily gathered; local produce can be consumed fresh, as sea urchins spoil easily; and local sea urchins remain a firm favorite in spite of the decline of consumption expenditure. Local sea urchins are in high demand, and the local brand is popular among both consumers and industry.

To compete against imports, a local brand must be built through awareness and association [7]. This requires repeated exposure of consumers to brand elements such as geographical origin (brand name) and fisheries information. As now required by law, the origin of the sea urchins is indicated at the point of sale, allowing consumers to identify the local brand. The survey results suggest that this constant reminder of origin builds both brand recognition and the perception of brand safety among consumers. Also the consumers build their strong image, which they prefer national products to imported products, and prefer local products to national products. Especially, local products are not only for consumer’s brand but also for processor’s brand, and the brand was able to take on brand loyalty. Therefore, the local demand could possess the competitiveness of pushing out imported products.

REFERENCES