Food Policy 35 (2010) 488–495

Contents lists available at ScienceDirect

Food Policy

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

The effects of fishery harbor-based brands on the brand equity of shore fish: An empirical study of branded mackerel in Japan

Takashi Ishida, Mototsugu Fukushige *

Garaduate School of Economics, Osaka University, 1-7, Machikaneyama-cho, Toyonaka, Osaka 560-0043, Japan

ARTICLE INFO

Article history:
Received 30 November 2008
Received in revised form 17 March 2010
Accepted 20 April 2010

Keywords:
Brand equity
Shore fish
Mackerel
Japan

ABSTRACT

In Japan, some fishery cooperative associations use their fishery harbor names as a brand to differentiate their own shore fish. Most notable is the branding of mackerel. In this paper, we analyze the effects of branding using a discrete/continuous model. The results are as follows. First, there is first-mover advantage in the branding of mackerel. For instance, unlike other brands of mackerel, *Seki-saba* as the pioneering brand can increase its brand equity. Second, other brands have opposing effects that increase and decrease the brand equity of the pioneering brand. We find the former is strongest in the early stages of fishery branding when there are few competing brands of mackerel, while the latter becomes stronger in later stages when many other brands emerge.

Introduction

Some studies have suggested that country-of-origin and region-of-origin labeling of agricultural products plays the same role as a brand. For example, Loureiro and McCluskey (2000) and Loureiro and Umberger (2007), respectively, estimated the willingness to pay for country-of-origin labeling on beef using a multinomial logit model, and a hedonic approach for US and Spanish consumers. They found that labeling with country or region of origin can increase consumers' willingness to pay. Moreover, Lans et al. (2001) argued that region of origin influences the preferences of consumers not only through perceived quality but also through the labeling itself. In turn, because the quality and safety of agricultural products depend on weather and the production process, labeling with a country or region of origin plays a role in informing the consumer about quality and/or safety, and therefore helps in the formation of brand equity.[1] Therefore, production centers that produce high-quality or safe agricultural products tend to differentiate their products by labeling them with country or region of origin.[2]

In Japan, not only agricultural products but also some shore fish are labeled by their region of origin. This is because even though shore fish are caught throughout Japan, their quality depends on the environment of a particular fishing ground, including the temperature of the seawater and the strength of tidal currents, along with the fishing and distribution procedures following landing.[3] Accordingly, some fishery cooperatives, which are organized by fishers in each harbor, use their harbor's name as a brand to differentiate their own shore fish. The purpose of differentiation is mainly to improve perceived quality and increase price premiums. Because it is difficult to adjust the catch of fish, price is a key factor in the income of fishers. Furthermore, recent revisions of the Japanese Trademark Act support the use of branding using regional names, known as "regional brands," derived from a particular fishery harbor or production center.[4] In fact, the revisions increased the use of regional brands dramatically.

This raises a number of questions. Can followers receive the benefit of a regional brand even if a pioneer brand exists? How do increases in the use of a regional brand affect the brand equity of a pioneer brand? Will the revision of the Trademark Act help more producers to increase their income by using a regional brand? This information is important in deciding whether fishery cooperatives and production centers should register their regional brands and how the government should implement a regional brand policy. In other words, if followers can increase their brand equity, they should register their regional brands. If the increase in the number of regional brands damages the brand equity of a

* Corresponding author. Tel./fax: +81 6 6850 5248.
E-mail address: mfuku@econ.osaka-u.ac.jp (M. Fukushige).

[1] Aaker (1995) suggested that brand equity comprises five components: brand loyalty, brand awareness, perceived quality, brand associations, and other proprietary brand assets.

[2] Wine and cheese are well-known examples of agricultural products differentiated using region-of-origin labeling.

[3] Jaffry et al. (2004) examined the differences in consumers' attitudes toward domestic and foreign fish but did not consider the differences found across fishery harbors.

[4] In the European Union, regions of origin of foods are protected by both designation of origin (PDO) and geographical indication (PGI).

0306-9192/$ - see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.foodpol.2010.04.004

pioneer brand, the owners of that brand should consider ways to protect it. Moreover, governments should tighten regulations on the use of regional brands if the revision of the Trademark Act does not help producers to increase their income by using regional brands. However, the effect of this increase in the use of regional brands on brand equity is not clear.

In this paper, we focus on the branding of mackerel, because it is the most popular shore fish caught countrywide. Moreover, several regional brands of mackerel already exist. For instance, the Saganoseki Fisheries Cooperative registered *Seki-saba* as the first regional brand of mackerel in 1991. These mackerel grow and are caught in the Bungo Channel and are landed at Saganoseki Fishery Harbor. Importantly, the strong tidal currents of the Bungo Channel make the mackerel's meat firm so it preserves its freshness and taste. Moreover, the Saganoseki Fisheries Cooperative controls both the fishing and distribution procedure to guarantee quality. Other brands of registered mackerel followed, notably *Toki-saba* in 1999 and *Shimizu-saba* in 2000. By 2004, six regional brands of mackerel were registered in Japan.

In this paper, we focus on these six brands of mackerel and clarify the effects of registration of a regional brand of mackerel as a trademark on brand equity. There are three main approaches to evaluating brand equity. The first is the financial approach, which derives brand equity from financial or accounting information. See, for example, Simon and Sullivan (1993). The second is the multi-attribute attitude model, which asks consumers to evaluate the attributes of goods directly and calculates preference for brands; for example, Park and Srinivasan (1994). The third is the hedonic approach, which regresses price on brand attributes and measures their contribution to price; for example, Park and Srinivasan (1994). Among these three methods, the financial approach measures the brand equity of a company as a whole. Unfortunately, because several species of fish are landed in each fishery harbor, we cannot measure brand equity by fish species using this approach. However, we can estimate brand equity for each species of fish with the multi-attribute attitude model or the hedonic method. Nevertheless, these methods require data on the attributes of goods, and in the case of mackerel, we cannot employ either, because it is difficult to assess their quantitative attributes.

Fortunately, Yoshino (1997) proposes measuring brand equity using an aggregated discrete/continuous model that we extend using changes in aggregate price data. We employ aggregate price data for several reasons. First, it is difficult to adjust the catch of fish (including mackerel). Therefore, it is not appropriate to measure brand equity using change in market share. Second, price is an important factor in the income of fishers. Third, auctions determine the price of most fish in Japan, including mackerel. Therefore, any change in price ought to reflect change in brand equity. We apply this method to measure the brand equity of mackerel for each fishery harbor and pose the following questions. First, did all brands of mackerel increase brand equity through registration? Second, how did the brand equity of *Seki-saba* change with the registration of the other mackerel brands?

The paper is organized as follows. "Discrete/continuous model" describes the discrete/continuous model. In "Data and procedure", we detail the branding dummy variables used to capture the effects of branding and estimate the model. In "Effect of the registration of a trademark", we analyze how brand equity changes with the registration of regional brands of mackerel as trademarks. Finally, we summarize the empirical findings in "Conclusion".

Discrete/continuous model

In this section, we analyze how brand equity varies with the registration of local brands of mackerel using the aggregated discrete/continuous model developed by Hanemann (1984). This model assumes that consumers' brand choice and volume of demand are determined simultaneously. There are already some empirical applications of this model, including Nair et al. (2005), Richards (2000) and Yoshino (1997). In this paper, we use the model that Yoshino (1997) extended to price equations. To begin with, we describe the model proposed by Hanemann (1984) and then extend it following Yoshino (1997).

Discrete/continuous model

Hanemann (1984) derived the individual demand function as follows. First, we specify the utility function for consumers as:

$$u = u\{x, \phi_1(b_1, \varepsilon_1), \phi_2(b_2, \varepsilon_2), \ldots, \phi_I(b_I, \varepsilon_I), z\}$$

where $x = (x_1, x_2, \ldots, x_I)$ is a vector of the levels of consumption of each brand, ϕ_i is the competitive power of the brand, b_i is the attribute of the brand, ε_i is a random variable and z is total expenditure on all other goods. Assuming that the competitive power of the brand, ϕ_i, depends on the attribute of the brand, b_i, we consider differences in utility among consumers to be differences in the attitudes of consumers toward brand b_i expressed as a function of ϕ_i.

Next, following Hanemann (1984), we assume that consumers choose only one brand, i, where $i = 1, 2, \ldots, I$. Consumers compare the conditional indirect utility of each brand and choose only one that maximizes their utility. The conventional utility function obtained in this manner is expressed as:

$$\upsilon = \max[\tilde{\upsilon}_1, \tilde{\upsilon}_2, \ldots, \tilde{\upsilon}_I], \tag{1}$$

where $\tilde{\upsilon}_i = \tilde{\upsilon}_i[p_i, \phi_i(b_i, \varepsilon_i), m]$ represents the conditional indirect utility function when the consumer chooses brand i. We express the conditional utility function where the consumer chooses brand i as $u_i = \bar{u}_i[x_i, \phi_i(b_i, \varepsilon_i), z]$. The consumer chooses (x_i, z) to maximize his/her conditional utility subject to the budget constraint $p_i x_i + z \leqslant m$ and the nonnegativity conditions $x_i \geqslant 0$ and $z \geqslant 0$, where p_i is the price of brand i and m is household income. Below, we derive the probability that the consumer chooses brand i and provides the conditional demand function.

Hanemann (1984) assumed that the following bivariate utility function expresses the conventional utility function of consumers:

$$u(x, \phi, z) = u^*\left(\sum x_i, z + \sum \phi_i x_i\right).$$

Using this assumption, we express the utility where brand i is selected as $u_i = u_i^*(x_i, z + \phi_i x_i)$. Now we define $w_I = x_i$, $w_{II} = z + \phi_i x_i$, and assume that u^* is quasi-concave in w_I or w_{II}. Then, where brand i is selected, the conditional demand, other expenditure and indirect utility functions are as follows:

$$\begin{aligned} \tilde{x}_i &= w_I^*(p_i - \phi_i, m) \\ \tilde{z} &= w_{II}^*(p_i - \phi_i, m) - \phi_i w_I^*(p_i - \phi_i, m) \\ \tilde{\upsilon}_i &= \tilde{\upsilon}_i^*(p_i - \phi_i, m). \end{aligned} \tag{2}$$

Because the conditional indirect utility function is a decreasing function of the difference between the price of brand i (p_i) and its competitive power (ϕ_i), the probability that the consumer chooses brand i is expressed as:

$$\begin{aligned} \pi_i &= \Pr\{p_i - \phi_i \leqslant p_j - \phi_j, \quad j = 1, 2, \ldots, I\}, \\ &= \Pr\{\varepsilon_i + \bar{\phi}_i - p_i \leqslant \varepsilon_j + \bar{\phi}_j - p_j, \quad j = 1, 2, \ldots, I\}, \\ &= \Pr\{\varepsilon_i + \lambda_i - \lambda_j \leqslant \varepsilon_j, \quad j = 1, 2, \ldots, I\}, \end{aligned} \tag{3}$$

where $\phi_i = \bar{\phi}_i + \varepsilon_i$ and $\lambda_i = \bar{\phi}_i - p_i$, $i = 1, 2, \ldots, I$.

Following Hanemann (1984), we now assume that the random variables, $\varepsilon_i, i = 1, 2, \ldots, I$, are independently and identically distributed according to the extreme value distribution. Their cumulative distribution function is $F(\varepsilon_i) = \exp[-\exp(-\varepsilon_i/\mu)]$, where μ is