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RESEARCH ARTICLE

Influence of brand equity on the price premium for private labels in fresh produce: A contingent valuation survey

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Abstract

In recent years, premium private labels for fresh produce grown with reduced use of synthetic pesticides and chemical fertilizers have been developed by Japanese general merchandise stores. In this paper, the brand equity factors that affect willingness to pay (WTP) for private label vegetables are identified using the contingent valuation method. We consider four key dimensions of brand equity, namely brand awareness, brand loyalty, perceived quality, and brand associations. We find that brand loyalty factors based on the psychology of consumers who seek value-added vegetables with health and safety characteristics have the largest effect on the WTP premium. Providing shoppers with clear information about the key product attributes of reduced use of synthetic pesticides and chemical fertilizers is particularly important to generate brand equity for private label vegetables. [EconLit citations: Q130, M310].

1 | INTRODUCTION

Private labels, defined as brands owned, sold, and distributed by a retailer, often offer consumers an alternative product of inferior quality at a value price (Hoch, 1996; Lincoln & Thomassen, 2008). In contrast, private labels on fresh produce (fruit and vegetables) indicate premium agricultural products because the goal of such labels, which are sold by very few national brands, is quality improvement (Codron, Giraud-Héraud, & Soler 2005). If grocery retailers are concerned about the environmental and health characteristics of their products, they develop private labels for fresh produce based on higher quality standards (Bergès-Sennou, Bontems, & Réquillart 2004). In Japan, several general merchandise stores have developed private labels for environmentally friendly fresh produce (e.g., AEON Co., Ltd., 2014; Ito-Yokado Co., Ltd., 2014). As indicated by Codron et al. (2005), these private labels represent premium agricultural products, and differentiate them from ordinary fresh produce.

Brand equity is a set of brand assets linked to a brand, its name, and its symbol (Aaker, 1991). Measuring brand equity is important in understanding brand strength. Price premium is considered to be the most useful indicator of brand equity, because any driver of brand equity should affect the price premium (Aaker, 1996). Private labels under a low-price policy do not generate a price premium when they are deemed inferior to other brands (Hoch, 1996); however, premium private labels such as those for environmentally friendly fresh produce are expected to do so.

Several previous studies of private label foods have evaluated either the price premium (Carlucci, Stasi, Nardone, & Seccia 2013; Sakagami, Sato, & Ueta 2006; Taglioni, Cavicchi, Torquati, & Scarpa 2011) or brand equity (Cuneo, Lopez, & Yagüe 2012; Larceneux, Benoit-Moreau, & Renaudin 2012). Carlucci et al. (2013) indicated that no premium prices are associated with the majority of retailers' yogurt brands. Sakagami et al. (2006) found that environmentally friendly vegetables certified by supermarket labels induce a lower positive willingness to pay (WTP) than those certified by government and nonprofit organization labels. Taglioni et al. (2011) showed that private milk labels can have either a negative or positive effect on WTP for different consumer classes. Cuneo et al. (2012) reported that private labels on yogurts build brand equity throughout their development. Larceneux et al. (2012) indicated that organic labeling information significantly improves perceptions of quality in low-equity private labels for smoked salmon. These studies suggest that value-added private label foods can generate a price premium or brand equity.

On the other hand, attempts have been made to identify the effects of brand equity on the price premium for goods such as condoms (Evans, Taruberekera, Longfield, & Snider 2011), apparel (Li & Ellis, 2014), and food (Anselmsson, Bondesson, & Johansson 2014; Davcik & Sharma, 2015). Anselmsson et al. (2014) showed that strong price premium determinants of consumer-packaged foods are the three brand image dimensions of uniqueness, social image, and home country origin. Davcik and Sharma (2015) found that company-based brand equity is positively related to food prices at the brand level. However, they did not include any information on the effects of brand equity dimensions on the price premium for value-added private label foods.

The objective of the present paper was to identify the brand equity factors that affect the price premium, namely consumers' WTP for private label fresh produce. We focused on consumer-based brand equity for environmentally friendly private label vegetables that may generate a price premium. Examining the relationship between the price premium and brand equity dimensions may grow the market for premium private label foods, and provide valuable perspectives for grocery retailers on managing them.

2 | MATERIALS AND METHODS

2.1 | Evaluation of private label vegetables

We evaluated private label vegetables, namely "Select Vegetables," branded with the name of a general merchandise store based in western Japan. Because only 0.35% of vegetables produced in Japan have organic certification (Ministry of Agriculture, Forestry and Fisheries of Japan, 2014), Japanese general merchandise stores have developed private labels primarily for vegetables grown with reduced use of synthetic pesticides and chemical fertilizers rather than for those produced organically. The "Select Vegetables" brand is a classic example of privately labeled vegetables in Japan.

Private label vegetables have been on sale since 2006. These are primarily domestically produced fresh root vegetables such as onions, carrots, potatoes, and burdock. Private label vegetables have three product attributes: (1) they are grown with reduced frequency of synthetic pesticide application and use of chemical nitrogen fertilizers to less than 70% of the levels seen in conventional production; (2) information is provided on the place of origin and the producer; and (3) their cultivation records are confirmed by the general merchandise store.

In the fresh produce section, ordinary vegetables are sold with information on the variety of vegetable and the place of origin (the prefecture). In contrast, a very small green label with a brand name, variety of vegetable, place of origin (the prefecture), and the producer's name is affixed to the packaging of private label vegetables. Small notices concerning the three product attributes of private label vegetables are posted in the fresh produce section. Small pictures with the producer's name and address (name of the city, town, or village) are also displayed. Although no specific information on the origin of private label vegetables is required, more detailed information (city, town, or village) is typically presented for private label vegetables than for ordinary vegetables (prefecture only).

2.2 | Contingent valuation method

Stated preference methods such as choice modeling and contingent valuation are used to estimate the value of the WTP premium (e.g., Bond, Thilmany, & Keeling Bond 2008; Managi, Yamamoto, Iwamoto, & Masuda 2008; Misra,

Huang, & Ott 1991; Sakagami et al., 2006; Taglioni et al., 2011). We chose the contingent valuation method to estimate the total WTP to be explained by brand equity factors. Contingent valuation has the advantage of providing the necessary information to assess benefits according to a variety of criteria (Mitchell & Carson, 1989). Although contingent valuation is vulnerable to a range of biases, we can avoid or minimize the bias effects by using appropriate approaches (Mitchell & Carson, 1989; Whitehead & Blomquist, 2006). Because the sales of branded vegetables, distinct from private label vegetables, were very small at the general merchandise store, other vegetable brands were not taken into account. Thus, choice modeling, which can be used to investigate the WTP for a number of goods, was not used in the present paper.

Payment card and dichotomous choice methods are the most popular approaches in contingent valuation research because such WTP questions are the easiest to place in a mail survey (Bateman et al., 2002; Whitehead, 2006). Here, the payment card question was used to elicit WTP amounts from the respondents. The advantage of the payment card approach is that it requires smaller usable samples than the dichotomous choice approach (Whitehead, 2006).

2.3 | Questionnaire design

At the beginning of the questionnaire, we asked about brand awareness, purchase frequency, knowledge of the product attributes of private label vegetables, followed by the payment card question. After their WTP a premium for private label vegetables had been elicited, respondents answered questions on brand equity topics except for brand awareness. Finally, they were asked about their socioeconomic characteristics.

For the payment card question, the three product attributes of private label vegetables were presented to respondents. We then asked them a question to elicit their WTP a premium for private label vegetables compared with ordinary domestically produced vegetables. The assumptions associated with contingent valuation were as follows: (1) both private label vegetables and ordinary vegetables were sold in the fresh produce section; (2) the same range of private label vegetables and ordinary vegetables was available; and (3) private label vegetables had information on place of origin, cultivation methods, and producers, whereas ordinary vegetables only had information on place of origin. Because a number of varieties of vegetables were sold as private label vegetables, we showed the respondents percentage scales to elicit their WTP a premium for the "Select Vegetables" private label brand. Respondents considered a series of price increase rates (3–50%) per unit sale of private label vegetables compared with ordinary vegetables. They were also given the option of providing an open answer to mitigate range bias. In the case of a zero answer, respondents answered several follow-up questions to allow the analysis of protest responses.

Four key dimensions of brand equity, namely brand awareness, brand loyalty, perceived quality, and brand associations were used in the questionnaire (Aaker, 1991; Yoo & Donthu, 2001). Brand awareness is the ability of a potential purchaser to recognize or recall that a brand belongs to a certain product category (Aaker, 1991). Respondents were asked whether they knew the brand name of private label vegetables from among competing brands based on an aided recall test. Brand loyalty is a measure of the attachment that a consumer has to a brand (Aaker, 1991). Respondents answered the questions on brand loyalty to private label vegetables based on Matsui's (1987) criteria, namely trust, familiarity, regret (about the lack of the product), liking, word-of-mouth recommendation that others buy the product, negative reaction to criticism of private label vegetables, self-motivated word-of-mouth recommendation, satisfaction, and persistence. Perceived quality is a consumer's perception of the overall quality of a product (Aaker, 1991). Respondents were asked whether they believed that private label vegetables were of higher quality than other vegetables. Brand associations are somehow linked in memory to a brand, such as through a brand image (Aaker, 1991; Keller, 1993). Respondents were asked whether they associated any product-related attributes of private label vegetables with those of environmentally friendly agricultural products, such as freshness, deliciousness, health, safety, or environmental friendliness (Managi et al., 2008).

2.4 | Survey

Between October 14 and 17, 2012, 2,000 survey forms were handed to shoppers in the food section of a general merchandise store to provide a baseline for a shopping center in Hikone City, Shiga, Japan. The shopping center has

approximately 40,000 square meters of store space, which is defined as the total store area for merchandising, restaurant, and service businesses excluding the distances between stores (Japan Council of Shopping Centers, 2016), and offers groceries, apparel, and entertainment in the form of a multiplex movie theater. Although the shopping center is not very large, its main anchor stores put it into the category of a regional shopping center (International Council of Shopping Centers, 2016). Hikone City (136°15′E and 35°16′N; Geospatial Information Authority of Japan, 2016) is located in the eastern part of Shiga Prefecture that neighbors Kyoto. It has a population of 112,632 and an area of 196.84 square kilometers (Hikone City, 2015).

Shoppers were randomly intercepted after they had paid the cashier (Jin & Suh, 2005; Sakagami et al., 2006). Those who agreed to cooperate with this survey were asked to return the questionnaire by mail using the reply-paid envelope provided. As a token of gratitude, we gave them a ballpoint pen. We used the 1,250 surveys that were returned within one month of our questionnaire distribution. Of these, 358 respondents were removed from the sample because either they had not responded to many questions ($n = 223$), or had provided inconsistent responses concerning private label vegetables ($n = 112$), or had returned protest responses ($n = 23$). Thus, the data set was comprised of 892 responses. The response rate (44.6%) was higher than that for similar studies in Japan, for example, those of Sakagami et al. (2006) (34.9%) and Managi et al. (2008) (28.1%). Our response rate generated a sample that was larger than the minimum recommended sample size for contingent valuation surveys (Bateman et al., 2002).

2.5 | Methodological framework

To identify the brand equity factors that affect WTP a premium for private label vegetables, we analyzed payment card data using an ordered probit model (Aguilar & Vlosky, 2007; Misra et al., 1991). Given the robust covariance matrix estimation, we used the ORDERED command in LIMDEP Version 9.0 to estimate the parameters (Greene, 2007).

3 | RESULTS

3.1 | Socioeconomic characteristics and WTP distribution

Table 1 presents the socioeconomic characteristics of the sample, which included a large number of females. The majority of the respondents were 40–59 years old, and had 2–4 household members, no children aged 18 or below in the household, and an annual household income of 2–6 million yen.

Table 2 compares the socioeconomic characteristics of the sample and the target population. Generally, a shopping center is considered to be a regional one if it serves a geographic area within a driving-time of 30 minutes (e.g., Boone & Kurtz, 2012; Forman, 2014; Lynch & Hack, 1984). Given the transportation conditions in Japan, the coverage area for a general merchandise store used as a baseline for a regional shopping center was assumed to be the area within a 20-kilometer radius, which is roughly equal to a driving-time within 30 minutes (Ministry of Economy, Trade and Industry of Japan, 2004; Namikata, 1993). When more than half a municipality's area was included within a 20-kilometer radius of the general merchandise store based on the Geospatial Information Authority of Japan (2016), we deemed the municipality residents to be included in the target population. Consequently, around 400,000 residents of Hikone City and its neighboring municipalities (the cities of Maibara, Higashiomi, and Omihachiman, in addition to the towns of Taga, Koura, Toyosato, and Aisho) were designated the target population (Ministry of Internal Affairs and Communications of Japan, 2011b). We found considerable differences in socioeconomic characteristics between the sample and the target population, except for the number of children.

Table 3 shows the distribution of WTP responses. The respondents with a positive WTP accounted for 57.1% of the sample. Most of them were reluctant to pay a price premium (Misra et al., 1991), and were only willing to pay a premium of less than 15%. On the other hand, a considerable number of respondents ($n = 383$) reported zero WTP because many of them perceived no difference in quality between private label vegetables and ordinary vegetables, and/or they preferred cheaper vegetables.

TABLE 1 Socioeconomic characteristics of the sample

	Category	*n*	% of *n*
Sex	Male	72	8.1
	Female	820	91.9
Age (years)	Under 20	1	0.1
	20–29	39	4.4
	30–39	134	15.0
	40–49	227	25.4
	50–59	241	27.0
	60–69	183	20.5
	70–79	59	6.6
	80 or over	8	0.9
Household size (persons)	1	65	7.3
	2	228	25.6
	3	219	24.6
	4	210	23.5
	5	102	11.4
	6	42	4.7
	7	21	2.4
	8	3	0.3
	9	2	0.2
Number of children aged 18 or under in the household (persons)	0	579	64.9
	1	137	15.4
	2	141	15.8
	3	33	3.7
	4	2	0.2
Annual household income (million yen)	Less than 2	50	5.6
	2 to < 4	209	23.4
	4 to < 6	267	29.9
	6 to < 8	171	19.2
	8 to < 10	98	11.0
	10 to < 15	76	8.5
	15 or more	21	2.4

3.2 | Descriptive statistics

Table 4 describes the variables included in the ordered probit model. Because the percentage scales of the WTP premium with low response rates were aggregated, the dependent variable of the rank-ordered WTP premium took one of five values, from 0 to 4. The explanatory variables were purchase frequency, knowledge of product attributes, brand equity of private label vegetables, and the respondents' socioeconomic characteristics. Of nine brand loyalty items, the three variables (trust, regret, and liking) were chosen on the basis of a decreased Akaike Information Criterion.

3.3 | Parameter estimates and marginal effects

Table 5 presents the parameter estimates of the ordered probit model. The variables of brand loyalty (trust, regret, and liking) and brand associations (the images of delicious, healthy, and safe products) were significant in the model.

TABLE 2 Comparison of socioeconomic characteristics between sample and target population

	Sample	Target Population
Ratio of females (%)[a]	91.9	51.0
Mean age (years)[ab]	51.7	43.8
Mean household size (persons)[a]	3.3	2.8
Mean number of children aged 18 or under in the household (persons)[a]	0.6	0.5
Mean annual household income (million yen)[cd]	6.1	7.1

[a]These indicators for the target population were calculated from the 2010 Population Census (Ministry of Internal Affairs and Communications of Japan, 2011b).
[b]In the sample, the respondents' age categories were converted as follows: 15 = under 20, 25 = 20–29, 35 = 30–39, 45 = 40–49, 55 = 50–59, 65 = 60–69, 75 = 70–79, and 85 = 80 or over.
[c]The average annual household income of the sample was calculated in accordance with the following definitions: 1 = less than 2, 3 = 2 to < 4, 5 = 4 to < 6, 7 = 6 to < 8, 9 = 8 to < 10, 12.5 = 10 to < 15, and 17.5 = 15 or more.
[d]This value for the target population shows average annual household income in 2009 weighted by the number of sample households in each municipality (Ministry of Internal Affairs and Communications of Japan, 2011a). However, we could not obtain data on annual household income in Taga, Koura, Toyosato, or Azuchi (merged with Omihachiman City in 2010).

TABLE 3 Distribution of WTP responses

	n	% of *n*
0%	383	42.9
1%[a]	1	0.1
1.5%[a]	2	0.2
3%	108	12.1
5%	144	16.1
10%	160	17.9
15%	24	2.7
20%	51	5.7
25%	4	0.4
30%	12	1.3
50%	3	0.3

[a]1% and 1.5% were reported in the open-answer option.

We expected these variables to contribute to an increase in WTP a premium, but a significantly negative impact was found in the delicious image variable. Among the socioeconomic characteristics, the age and income variables had significantly positive parameters, whereas the household size variable had a significantly negative parameter.

Table 6 presents the marginal effects on probabilities of the ordered probit model. Of the brand equity variables, the regret and liking variables had the two largest effects on increased WTP premium.

4 | DISCUSSION

4.1 | Findings and implications

Product features are the primary source of brand value (Gabay, Moskowitz, Beckley, & Ashman 2009). For private label vegetables, the reduced use of synthetic pesticides and chemical fertilizers must be the most important product attribute that differentiates them from ordinary vegetables. Other product attributes of private label vegetables may not contribute greatly to an increase in the WTP premium because they are not directly related to quality improvement.

TABLE 4 Description of the variables included in the ordered probit model

	Definition	*M*	*SD*
Dependent variable			
WTP	0 = WTP: 0%, 1 = WTP: 1–3%, 2 = WTP: 5%, 3 = WTP: 10%, 4 = WTP: 15–50%	1.407	1.447
Explanatory variables			
Name awareness	1 = the respondent knows the brand name of private label vegetables, 0 = otherwise	0.704	0.457
Purchase frequency	2 = frequent buyer of private label vegetables, 1 = occasional buyer of private label vegetables, 0 = none or unaware	0.728	0.655
Reduced use	1 = the respondent knows the product attribute of reduced use of synthetic pesticides and chemical fertilizers, 0 = otherwise	0.142	0.350
Provision of information	1 = the respondent knows the product attribute of provision of information on the place of origin and the producer, 0 = otherwise	0.590	0.492
Confirmation of records	1 = the respondent knows the product attribute of confirmation of cultivation records by the general merchandise store, 0 = otherwise	0.098	0.297
Trust	1 = the respondent feels that private label vegetables are products that generate trust, 0 = otherwise	0.703	0.457
Regret	1 = the respondent would feel regret if private label vegetables were not produced, 0 = otherwise	0.482	0.500
Liking	1 = the respondent likes private label vegetables, 0 = otherwise	0.400	0.490
Higher quality	1 = the respondent perceives the quality of private label vegetables to be higher than that of other vegetables, 0 = otherwise	0.713	0.453
Fresh image	1 = the respondent has an image of freshness of private label vegetables, 0 = otherwise	0.428	0.495
Delicious image	1 = the respondent has an image of deliciousness of private label vegetables, 0 = otherwise	0.175	0.380
Healthy image	1 = the respondent has an image of healthiness of private label vegetables, 0 = otherwise	0.492	0.500
Safe image	1 = the respondent has an image of safety of private label vegetables, 0 = otherwise	0.806	0.396
Environmentally friendly image	1 = the respondent has an image of environmental friendliness of private label vegetables, 0 = otherwise	0.307	0.462
Sex	1 = male, 0 = female	0.081	0.273
Age	Respondent's age (years): 15 = under 20, 25 = 20–29, 35 = 30–39, 45 = 40–49, 55 = 50–59, 65 = 60–69, 75 = 70–79, 85 = 80 or over	51.738	13.087
Household size	Number of household members (persons)	3.328	1.449
Number of children	Number of children aged 18 or under in the household (persons)	0.590	0.899
Income	Natural logarithm of annual household income (million yen): Ln(1) = less than 2, Ln(3) = 2 to < 4, Ln(5) = 4 to < 6, Ln(7) = 6 to < 8, Ln(9) = 8 to < 10, Ln(12.5) = 10 to < 15, Ln(17.5) = 15 or more	1.636	0.612

Surprisingly, only 14.2% of the samples were aware of the key product attribute, namely the reduced use of synthetic pesticides and chemical fertilizers. Because information posters were very small and there were no additional sources of information on the product attributes (according to staff members responsible for private label vegetables in the general merchandise store, personal communication, September 5, 2012), most respondents purchased private label vegetables without recognizing the key product attribute as a primary source of WTP. In fact, most shoppers in the general merchandise store scarcely generated brand equity for private label vegetables. Furthermore, we note that most respondents evaluated brand equity for private label vegetables based on knowledge that they had only gained from the questionnaire.

TABLE 5 Parameter estimates of the ordered probit model

	Coefficient	*z*
Constant	−1.304***	−4.74
Name awareness	−0.096	−0.72
Purchase frequency	0.119	1.41
Reduced use	0.107	0.99
Provision of information	−0.080	−0.84
Confirmation of records	0.172	1.38
Trust	0.188*	1.84
Regret	0.525***	5.18
Liking	0.534***	5.63
Higher quality	0.046	0.44
Fresh image	0.091	1.11
Delicious image	−0.191**	−2.05
Healthy image	0.188**	2.30
Safe image	0.255**	2.48
Environmentally friendly image	0.016	0.19
Sex	0.039	0.25
Age	0.008**	2.24
Household size	−0.128***	−3.49
Number of children	0.039	0.64
Income	0.347***	4.67
μ_1	0.398***	7.50
μ_2	0.917***	11.56
μ_3	1.697***	17.93
Log likelihood function	−1166.2	
Akaike Information Criterion	2378.4	

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The μ values are the threshold parameters.

Regret over the lack of value-added vegetables and liking for them were both attributable to the psychological characteristics of health- and safety-conscious respondents, which created brand loyalty to the vegetables that embodied the key product attribute. On the other hand, trust was generated by reliable quality based on confirmation from cultivation records kept by the general merchandise store (Pappu & Quester, 2006). Because most respondents did not know the key product attribute, it was difficult for them to generate trust in product quality through repeated use (Matsui, 1987).

Not all of the brand associations with different images conformed to our expectations. Clearly, respondents recalled images of health and safety as the key product attribute. However, contrary to our expectations, the deliciousness image prompted a decrease in the WTP a premium. Respondents who had a deliciousness image accounted for only 17.5%, and this image had a positive effect on the probability of a 0% WTP. Because they prefer cheaper vegetables, such respondents are generally concerned about a price increase for private label vegetables with a deliciousness image. Although freshness was the most important criterion in purchasing vegetables (Sakagami et al., 2006), no product attributes of private label vegetables certified them to be fresher than ordinary vegetables. Nor was an environmentally friendly image directly associated with better quality of private label vegetables in the minds of respondents. Environmentally friendly production, such as organic production, provides environmental

TABLE 6 Marginal effects on probabilities of the ordered probit model

	Prob[WTP = 0%]		Prob[WTP = 1–3%]		Prob[WTP = 5%]		Prob[WTP = 10%]		Prob[WTP = 15–50%]	
	Effect	*z*	Effect	*z*	Effect	*z*	Effect	*z*	Effect	*z*
Name awareness	0.038	0.73	0.00041	0.36	−0.008	−0.75	−0.017	−0.72	−0.013	−0.70
Purchase frequency	−0.046	−1.41	−0.00014	−0.19	0.010	1.39	0.021	1.39	0.016	1.38
Reduced use	−0.041	−1.00	−0.00076	−0.50	0.008	1.05	0.019	0.98	0.015	0.93
Provision of information	0.031	0.84	0.00019	0.32	−0.006	−0.84	−0.014	−0.84	−0.011	−0.82
Confirmation of records	−0.066	−1.41	−0.00205	−0.68	0.012	1.59	0.031	1.36	0.025	1.23
Trust	−0.074*	−1.83	0.00088	0.57	0.016*	1.70	0.033*	1.80	0.023*	1.86
Regret	−0.202***	−5.28	−0.00136	−0.43	0.041***	4.14	0.092***	4.28	0.071***	4.10
Liking	−0.204***	−5.79	−0.00489	−1.44	0.038***	4.40	0.094***	4.49	0.077***	4.25
Higher quality	−0.018	−0.44	0.00001	0.04	0.004	0.43	0.008	0.44	0.006	0.45
Fresh image	−0.036	−1.11	−0.00020	−0.34	0.007	1.10	0.016	1.10	0.012	1.09
Delicious image	0.075**	2.04	−0.00160	−0.81	−0.017*	−1.83	−0.034**	−2.02	−0.023**	−2.11
Healthy image	−0.073**	−2.31	−0.00027	−0.23	0.015**	2.17	0.034**	2.22	0.025**	2.16
Safe image	−0.101**	−2.46	0.00277	0.99	0.023**	2.15	0.045**	2.41	0.030**	2.55
Environmentally friendly image	−0.006	−0.19	−0.00003	−0.13	0.001	0.19	0.003	0.19	0.002	0.19
Sex	−0.015	−0.25	−0.00015	−0.15	0.003	0.26	0.007	0.25	0.005	0.25
Age	−0.003**	−2.24	−0.00001	−0.20	0.001**	2.11	0.001**	2.13	0.001**	2.16
Household size	0.050***	3.48	0.00015	0.20	−0.010***	−3.04	−0.023***	−3.13	−0.017***	−3.14
Number of children	−0.015	−0.64	−0.00005	−0.19	0.003	0.64	0.007	0.64	0.005	0.64
Income	−0.135***	−4.66	−0.00042	−0.20	0.028***	3.80	0.062***	3.87	0.046***	3.86

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

benefits as a public-good dimension (Bond et al., 2008), but the majority (69.3%) of respondents did not imagine an environmental benefit from the key product attribute of reduced use of synthetic pesticides and chemical fertilizers.

Brand awareness and perceived quality dimensions had no impact on WTP a premium. It was difficult for shoppers to connect the brand name of private label vegetables with the key product attribute of reduced use of synthetic pesticides and chemical fertilizers. Thus, WTP a premium was not generated by name awareness alone. A perceived quality advantage enables a brand to charge a price premium (Aaker, 1991). However, any difference in quality between private label vegetables and ordinary vegetables should be small because, unlike organic vegetables, private label vegetables do not require zero use of synthetic pesticides and chemical fertilizers. Although 71.3% of the respondents believed that private label vegetables were of higher quality, in fact they did not perceive the improved quality when consuming private label vegetables. Thus, the small quality improvement of private label vegetables did not justify WTP a premium.

With respect to socioeconomic characteristics, the respondents who were likely to have a greater WTP a premium were elderly and high-income people with small households. Sex and number of children were not important for WTP a premium.

Marginal effects on probabilities of WTP a premium enabled us to find important brand equity factors for private label vegetables. Because brand loyalty was the core of a brand's equity and a basic indicator of WTP a premium (Aaker, 1991, 1996), the brand loyalty variables of regret and liking were the most important factors that increased it. The brand loyalty factor of trust based on reliable quality from the general merchandise store (Pappu & Quester, 2006) had smaller positive effects on WTP a premium than regret or liking derived from the key product attribute. For brand associations, the key product attribute recalled images of safety, health, and deliciousness for respondents. The positive effects on WTP a premium of either safety or health images offset the negative effects of deliciousness.

Developing premium private labels for organic vegetables is an effective way to generate greater consumer-based brand equity (Larceneux et al., 2012). People who are willing to pay a price premium for private label vegetables with reduced use of synthetic pesticides and chemical fertilizers can be targeted for premium private labels in organic vegetables. However, price-conscious consumers with 0% WTP would not purchase organic vegetables with premium private labels.

4.2 | Differences in socioeconomic characteristics between sample and target population

We distributed the questionnaires to shoppers directly in the food section of a general merchandise store. Similar to the respondents to a previous supermarket survey in Japan (Sakagami et al., 2006), most shoppers were middle-aged females. The sample contained few young single people, who may not cook their own meals frequently. Consequently, compared with the target population, the shoppers' characteristics caused the sample to have a much larger ratio of females and a higher mean age.

In terms of household characteristics, the sample had a greater mean household size and a slightly higher mean number of children than the target population. One reason for these differences is that the sample had very few single-person households. The sample also had a lower mean annual household income. This suggests that the sample had a larger number of retired-couple households with low income than the target population.

These differences in socioeconomic characteristics, especially annual household income and household size, between the sample and the target population may potentially affect the estimation results. Because of its greater mean annual household income and smaller mean household size, the target population households can be assumed to have more disposable income per capita than the sample households. Thus, the target population should express a greater WTP a premium for private label vegetables than the sample. Given that the price premium indicates the strength of the brand (Aaker, 1996), the target population may evaluate brand equity to be higher when it has a greater WTP a premium.

5 | CONCLUSION

Using the contingent valuation method, we identified the brand equity factors that affected the price premiums for private label vegetables grown with reduced use of synthetic pesticides and chemical fertilizers. The payment card survey showed that 57.1% of the respondents reported a positive WTP for private label vegetables, and most were willing to pay a premium of less than 15%. It also indicated that when the respondents did not perceive any difference in quality between private label and ordinary vegetables, and/or preferred cheaper vegetables, they tended to express a zero WTP.

An ordered probit model was applied to analyze the relationship between the WTP a premium and brand equity dimensions for private label vegetables. We found that liking, regret, and trust in brand loyalty and safety and health image associations were important brand equity factors that increased WTP a premium. In contrast, the results showed that an image of deliciousness in brand associations contributed to a decrease in WTP a premium. The primary reasons for this were that most respondents did not have an image of delicious private label vegetables and people who preferred cheaper vegetables were concerned about the price increase in such vegetables. Furthermore, elderly and high-income shoppers with small households were targeted for private label vegetable sales. These findings should help when grocery retailers decide on marketing strategies for premium private labels for environmentally friendly vegetables.

Notifying shoppers more clearly about the key product attribute of reduced use of synthetic pesticides and chemical fertilizers, which is a source of health and safety characteristics, is particularly important to generate brand equity for these private label vegetables. However, most respondents were not aware of the key product attribute because notices displayed in the fresh produce section were very small. They only learned this information from the questionnaire. For the key product attribute to become widely known to shoppers, there is a need not only to use sufficiently large posters in the fresh produce section but also to provide additional sources of information such as billboard, TV, radio, and newspaper advertisements.

When grocery retailers develop premium private labels for organic vegetables, the brand equity of consumers who are interested in health and safety may be enhanced. However, the current production of organic vegetables in Japan is extremely small. Thus, for the time being, private labels for vegetables grown with reduced amounts of synthetic pesticides and chemical fertilizers will remain one of the primary products in the fresh produce sections of Japanese general merchandise stores.

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