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## **Influencing Factors of Japanese Consumer Purchasing Decisions for Locally Produced Agricultural Products**

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### **Abstract**

We estimated a logit model to identify Japanese consumer characteristics that might indicate willingness to purchase locally produced vegetables. The results show important factors influencing consumer purchasing decisions for locally produced vegetables are: consumer concerns about origin of produce; consumer image of healthfulness, safeness and expensiveness of locally produced vegetables; consumers having ever heard the ‘local consumption of local produce’ slogan; and consumers often buying locally produced agricultural products. The results also show some demographic characteristics such as age and gender are important factors influencing consumer purchasing decisions for locally produced vegetables.

### **I. Introduction**

Food safety issues are receiving greater attention than ever in Japan. In order to ensure more consumer confidence in food safety, Japanese farmers and agricultural cooperatives are trying to advertise and promote the ‘local consumption of local produce (LCLP)’ slogan. LCLP consists not only of promoting consumption of local agricultural products but also building ties between producers and consumers (Ministry of Agriculture, Forestry and Fisheries, 2008).

Despite the growing interest in LCLP, little research has been conducted to identify the factors that affect consumer response to purchasing decisions for

locally produced agricultural products (LPAP). This information could be useful for identifying and targeting those consumers most willing to build loyalties with LPAP.

The purpose of this study is to identify the characteristics that affect Japanese consumer decisions for LPAP. In particular, we estimate a logit model using a consumer survey conducted at a supermarket in Japan.

## II. Literature Review

In USA, Loureiro and Hine (2002) assessed consumer preferences for local (Colorado grown), organic, and GMO-free potatoes in order to discover their potential niche markets. Their results suggested that the attribute local (Colorado grown) carries a higher willingness to pay than organic and GMO-free attributes. Jekanowski *et al.* (2000) estimated a probit model to determine the demographic and attitudinal factors which were most important in predicting the likelihood of consumers to purchase products that were produced within the state of Indiana. They found a greater tendency for female consumers to purchase such products. They also found that quality perceptions play a critical role in these food purchase decisions.

In Japan, there is ample literature dealing with consumer purchasing behavior regarding LPAP sold in farmers' markets (e.g., Katakura and Yoshino, 2002; Oura, 2002; Tsuji *et al.*, 2003; Datai, 2004; Makiyama and Mitomi, 2004). Yamamoto *et al.* (2008) estimated the WTP for LPAP using data obtained from a consumer survey at a supermarket in Japan. However, they do not identify the characteristics that affect consumer response to purchasing decisions to LPAP. Thus, we are attempting to identify the characteristics that affect consumer response to purchasing decisions for LPAP using Yamamoto *et al.* (2009)' data.

## III. Data and Model

Our focus was upon the examination of the Japanese consumer purchasing decisions for locally produced vegetables. In order to obtain data, we conducted the consumer survey at a supermarket in Sapporo, Japan in October 2005 (Yamamoto *et al.*, 2009). In total, 799 questionnaires were collected. Of these, 143 respondents did not answer a large number of questions and were removed from the sample. Thus, the data set comprises 656 samples.

The model is estimated using the following set of survey-response variables to identify the characteristics that affect consumer response to purchasing decisions (Table 1):

- (1) *Likelihood of Purchasing Locally Produced Vegetables* =  
 $f(\text{PRICE}, \text{FRESH}, \text{LEVEL}, \text{IMFRESH}, \text{IMHEALTHY}, \text{IMSAFETY},$

**Table 1.** Variable Definition

| Variable         | Description                                                                                                                                                                                                                                                                                                                                 |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>PRICE</i>     | Dummy variable, 1=Consumers attach importance to prices of ordinary vegetables, 0=otherwise.                                                                                                                                                                                                                                                |
| <i>FRESH</i>     | Dummy variable, 1=Consumers attach importance to freshness of ordinary vegetables, 0=otherwise.                                                                                                                                                                                                                                             |
| <i>LEVEL</i>     | Consumers attach importance to the produce origin of ordinary vegetables,<br>1=no concern about the produce origin<br>2=concern about the produce origin of Japan<br>3=concern about the produce origin of a prefecture<br>4=concern about the produce origin of a city, town or village<br>5=concern about the produce origin of a farmer. |
| <i>IMFRESH</i>   | Dummy variable, 1=Consumers have an image of freshness of locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                                            |
| <i>IMHEALTHY</i> | Dummy variable, 1=Consumers have an image of healthfulness of locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                                        |
| <i>IMSAFETY</i>  | Dummy variable, 1=Consumers have an image of safeness of locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                                             |
| <i>IMENVIRO</i>  | Dummy variable, 1=Consumers have an image of environmental friendliness of the locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                       |
| <i>IMDELICI</i>  | Dummy variable, 1=Consumers have an image of better taste of locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                                         |
| <i>IMQUALITY</i> | Dummy variable, 1=Consumers have an image of 'no quality difference between locally produced vegetables and other vegetables', 0=otherwise.                                                                                                                                                                                                 |
| <i>IMEX</i>      | Dummy variable, 1=Consumers have an image of expensiveness of locally produced vegetables compared to other vegetables, 0=otherwise.                                                                                                                                                                                                        |
| <i>HEAR</i>      | Dummy variable, 1=Consumers have heard the 'local consumption of local produce (LCLP)' slogan, 0=otherwise.                                                                                                                                                                                                                                 |
| <i>WTP</i>       | Consumers willingness to pay price premiums for locally produced vegetables<br>Price premiums=(prices of locally produced vegetables/prices of other vegetables-1) * 100.                                                                                                                                                                   |
| <i>VEGPURCHA</i> | Dummy variable, 1=Consumers often buy locally produced agricultural products (LPAP), 0=otherwise.                                                                                                                                                                                                                                           |
| <i>INCOME</i>    | Annual household income<br>100 = <¥2,000,000<br>300 = ¥2,000,000 – 3,999,999<br>500 = ¥4,000,000 – 5,999,999<br>700 = ¥6,000,000 – 7,999,999<br>900 = ¥8,000,000 – 9,999,999<br>1,250 = ¥10,000,000 – 14,999,999<br>1,750 = ≥¥15,000,000.                                                                                                   |
| <i>MIDDLEAGE</i> | Dummy variable, 1=40–59 years old, 0=otherwise.                                                                                                                                                                                                                                                                                             |
| <i>HIGHAGE</i>   | Dummy variable, 1=More than or equal to 60 years old, 0=otherwise.                                                                                                                                                                                                                                                                          |
| <i>GENDER</i>    | Dummy variable, 1=Male, 0=female.                                                                                                                                                                                                                                                                                                           |
| <i>CHILD</i>     | Dummy variable, 1=Respondents have children living in their household, 0=otherwise.                                                                                                                                                                                                                                                         |
| <i>HSIZE</i>     | Number of persons living in their household.                                                                                                                                                                                                                                                                                                |

*IMENVIRO, IMDELICI, IMQUALITY, IMEX, HEAR, WTP, VEGPURCHA, INCOME, MIDDLEAGE, HIGHAGE, GENDER, CHILD, HSIZE).*

The respondents were asked whether they had experienced purchasing locally produced vegetables at a supermarket. This small and medium sized supermarket has a grocery department of locally produced vegetables as well as a grocery department of non-locally produced vegetables. The dependent variable is an assumed variable taking a value of one when consumers experienced purchasing locally produced vegetables.

Using the information of the previous studies (Katakura and Yoshino, 2002; Oura, 2002; Tsuji *et al.*, 2003; Datai, 2004; Makiyama and Mitomi, 2004) and our interviewing results of this supermarket, nineteen independent variables were chosen to identify the characteristics that affect consumer response to purchasing decisions. Three variables controlled consumer concerns about price, freshness and produce origin of ordinary vegetables. The *PRICE* variable is an assumed variable taking a value of one when consumers attach importance to prices of vegetables in making their purchase decisions. The *FRESH* variable is an assumed variable taking a value of one when consumers attach importance to fresh vegetables in making their purchase decisions. The *LEVEL* variable is an assumed variable taking a value of one when consumers attach importance to the produce origin of vegetables. We expect that consumers having these concerns will have a greater likelihood of purchasing locally produced vegetables.

Seven variables were used for images of locally produced vegetables. These variables are *IMFRESH* (freshness), *IMHEALTHY* (healthfulness), *IMSAFETY* (safeness), *IMENVIRO* (environmental friendliness), *IMDELICI* (better taste), *IMQUALITY* ('no quality difference between locally produced vegetables and other vegetables'), and *IMEX* (expensiveness). An assumed variable is used to represent the images of locally produced vegetables (Table 1). We expect that consumers having images of freshness, healthfulness, safeness, better taste and environmental friendliness will have a greater likelihood of purchasing locally produced vegetables. We also expect that consumers having images of 'no quality difference between locally produced vegetables and other vegetables' and expensiveness will have a negative effect on likelihood of purchasing locally produced vegetables.

The respondents were asked whether they had heard the 'local consumption of local produce (LCLP)' slogan. *HEAR* is an assumed variable taking a value of one when consumers had heard the LCLP slogan. We expect that consumers having heard the slogan will have a greater likelihood of purchasing locally produced vegetables. The respondents were also asked their willingness to pay price premiums for locally produced vegetables. *WTP* is a variable regarding consumer willingness to pay price premiums for locally produced vegetables. We expect the likelihood of purchasing locally produced vegetables increases

with more willingness to pay price premiums for these products.

One variable was used for controlling consumer shopping behaviors of locally produced agricultural products (LPAP). The respondents were asked whether they often buy LPAP. *VEGPURCHA* is an assumed variable taking a value of one when consumers often buy LPAP. We expect that consumers often buying LPAP will have a greater likelihood of purchasing locally produced vegetables.

Income is also expected to play an important role in making their purchase decisions. *INCOME* is a variable representing annual household income. We expect the likelihood of purchasing locally produced vegetables increases with increasing annual household income.

Five variables controlled demographic characteristics. *MIDDLEAGE* is an assumed variable taking a value of one when respondents were 40–59 years old. *HIGHAGE* is an assumed variable taking a value of one when respondents were more than or equal to 60 years old. *GENDER* is an assumed variable taking a value of one when respondent is male. *CHILD* is an assumed variable taking a value of one when respondents had children living in their household. *HSIZE* is number of persons living in their household. We have no strong expectations concerning the effects of these variables.

Finally, we briefly mention how we estimated the above model. We assume that the model is linear as concerns independent variables. Ordinary Least Square estimation could result in predicted probabilities greater than or less than a value of one due to the limited dependent variable. Thus, we assume the logit specification in the model and conducted Maximum Likelihood estimation.

#### IV. Results

The estimation results are reported in Table 2. All of the coefficients on variables other than demographic variables display their expected signs. Eleven coefficients out of twenty coefficients are statistically significant at the 5% level.

As for variables controlled for consumer concerns about ordinary vegetables, the coefficient on *LEVEL* variable is positive and statistically significant at the 5% level. This shows consumer concerns about the produce origin of vegetables has a significantly positive effect on the probability of consumers purchasing locally produced vegetables.

As for variables used for images of locally produced vegetables, three coefficients are statistically significant. Both coefficients on *IMHEALTHY* and *IMSAFETY* variable are positive and statistically significant at the 1% level. This result shows consumer image of healthfulness and safeness of locally produced vegetables has a significantly positive effect on the probability of consumers purchasing locally produced vegetables. The coefficient on *IMEX* variable is negative and statistically significant at the 5% level. This implies the

**Table 2.** Parameter Estimates of Logit Model

| Variable               | Coefficient | Standard Error | P-Value |
|------------------------|-------------|----------------|---------|
| <i>PRICE</i>           | 0.617       | 0.347          | 0.075   |
| <i>FRESH</i>           | 0.011       | 0.405          | 0.979   |
| <i>LEVEL</i>           | 0.381*      | 0.183          | 0.038   |
| <i>IMFRESH</i>         | 0.699       | 0.398          | 0.079   |
| <i>IMHEALTHY</i>       | 1.490**     | 0.451          | 0.001   |
| <i>IMSAFETY</i>        | 1.018**     | 0.297          | 0.001   |
| <i>IMENVIRO</i>        | 0.279       | 0.593          | 0.638   |
| <i>IMDELICI</i>        | 0.344       | 0.285          | 0.228   |
| <i>IMQUALITY</i>       | -0.861      | 0.517          | 0.096   |
| <i>IMEX</i>            | -0.739*     | 0.341          | 0.030   |
| <i>HEAR</i>            | 0.879**     | 0.303          | 0.004   |
| <i>WTP</i>             | 1.87E-02    | 2.42E-02       | 0.440   |
| <i>VEGPURCHA</i>       | 0.988**     | 0.292          | 0.001   |
| <i>INCOME</i>          | 6.06E-04    | 4.97E-04       | 0.223   |
| <i>MIDDLEAGE</i>       | 1.952**     | 0.324          | 0.000   |
| <i>HIGHAGE</i>         | 2.564**     | 0.456          | 0.000   |
| <i>GENDER</i>          | -0.924**    | 0.308          | 0.003   |
| <i>CHILD</i>           | 1.246**     | 0.407          | 0.002   |
| <i>HSIZE</i>           | -0.236      | 0.130          | 0.070   |
| <i>Constant</i>        | -3.056**    | 0.908          | 0.001   |
| Likelihood Ratio       |             | 185.3256       |         |
| % Correct Predictions  |             | 88.57          |         |
| Number of Observations |             | 656            |         |

Note: \*\*Significant at 1%, \*significant at 5%.

consumer image of expensiveness of locally produced vegetables has a significantly negative effect on the probability of consumers purchasing locally produced vegetables.

The coefficient on *HEAR* variable is positive and statistically significant at the 1% level. This indicates consumers having heard 'local consumption of local produce (LCLP)' slogan have a significantly positive effect on the probability of consumers purchasing locally produced vegetables. The coefficient on *VEGPURCHA* variable is also positive and statistically significant at the 1% level. The result shows consumers often buying LPAP have a significantly positive effect on the probability of consumers purchasing locally produced vegetables.

The four coefficients on variables controlled for demographic characteristics are statistically significant. Each coefficient on *MIDDLEAGE*, *HIGHAGE*, and *CHILD* variable is positive and statistically significant at the 1% level. This implies consumers being middle aged or elderly, and having children in their household have a significantly positive effect on the probability of consumers purchasing locally produced vegetables. The coefficient on *GENDER* variable is

negative and statistically significant at the 1% level. This result shows females tend to be more likely to purchase locally produced vegetables than males.

## V. Conclusions

We estimated a logit model to identify Japanese consumer characteristics that might indicate willingness to purchase locally produced vegetables. The results show important factors influencing consumer purchasing decisions for locally produced vegetables are: consumer concerns about origin of produce; consumer image of healthfulness, safeness and expensiveness of locally produced vegetables; consumers having ever heard the ‘local consumption of local produce’ slogan; and consumers often buying locally produced agricultural products (LPAP). The results also show some demographic characteristics such as age and gender are important factors influencing consumer purchasing decisions for locally produced vegetables. Identifying and targeting these characteristics of consumers may contribute to a positive effect on sales of LPAP.

Finally, we note a caveat of this study. Our data covers only a single city in Japan. Thus, how representative the sample truly is needs to be kept in mind when evaluating the broader implications of this study’s findings.

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