The effects of Information and Country of Origin on Japanese Olive Oil Consumer Selection

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I. INTRODUCTION

Consumption of olive oil has been limited to and associated with the producing regions of the world. Consumption in non-traditional markets however has increased since the 1990s and has been consolidated during the 2000s. Japan is among the leading emerging markets with an average annual consumption exceeding 30,000 tonnes (Table 1). Such a growing acceptance is due to the perceived nutritional and health characteristics but also because olive oil embodies the traditional Mediterranean diet model (Mili, 2004).

During the last two decades, olive oil market in Japan has been expanding due to dietary and health concerns. Nowadays, olive oil is common matter for Japanese. Japanese olive oil imports are increasing sharply since 1996 (annual imports never reached 10,000 tons before 1996). In the 1990s, imports were mainly concentrated on non-virgin olive. During the 2000s, virgin olive oil imports increased rapidly and have exceeded non-virgin oil imports, indicating a shifting in Japanese olive oil imports from non-virgin to virgin olive oil with higher-prices and higher-quality. The prices of oils move widely. In the early 1990s, the increasing trend of olive oil imports is so strongly that it could overcome the effect of price increasing. On the other hand, in the late 2000s, the increase of olive oil consumption could be caused by price reduction from 2007.

The number of Japan's trading partners has increased from 5 countries in 1988 to reach in 2009 about 24 partners from all continents. Japan imports olive oil mainly from Italy and Spain, but various countries can enter into Japanese olive oil market (Table 1). Recently, imports of olive oil from Turkey are increasing because of its lower price. Prices of olive oil imported from countries which have small share in the Japanese market tend to be high. There seems to be a niche market for high quality olive oil from specific countries with low market power. The market trends above indicate that Japanese consumers have become interested not only in price but also in information about quality and country of origin.

It is increasingly recognized that both the country of origin and information matter in food demand and consumer behaviour. Differentiation by country of origin has been the core of import demand using the Armington model. Studies dealing with the differentiation of olive oil by country of origin include Briz & Mili (1991) and Rodriguez (2001). Information, also, has played an important role in explaining consumer behaviour and particularly in assessing product quality.

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Table 1. Trading partners, olive oil import and import price of Japan (2009)

Country	Quantity(ton)	Share	Price (Yen/kg)
Italy	16,365.80	49.42%	597.3
Spain	14,109.06	42.61%	427.0
Turkey	1,895.43	5.72%	391.4
Greece	398.86	1.20%	649.8
Argentina	81.13	0.24%	481.9
France	60.20	0.18%	1,177.3
Egypt	53.40	0.16%	350.5
Israel	50.48	0.15%	1,004.7
Australia	28.47	0.09%	1,100.1
Portugal	26.25	0.08%	1,393.0
United Kingdom	25.22	0.08%	717.1
United States of America	11.74	0.04%	1,177.2
Tunisia	6.06	0.02%	620.5
Others	16.32	0.05%	1,398.2
Total	33,115.53	100.00%	513.9

Source: Trade Statistics of Japan (Ministry of Finance).

Nelson (1970) investigated information effects on different products and suggested that these effects are bigger on experience goods like food rather than search goods. Tybout et al. (1981) used information theory, to investigate how different adverse rumours affect consumer attitude to McDonald hamburgers. McEachern and Warnaby (2008) examined the relationship between consumer knowledge about value-based labels (e.g. eco-label, quality assurance label) and purchase of food with the kind of labels and found that product knowledge plays a significant role in purchase. Other studies have investigated the role of information related to health and nutrition. Hassan et al. (2010) investigated the impact of nutrition information on consumers' choice of cakes. Huffman et al. (2007) examined the role of consumer's prior beliefs and new information about GM technology on the willingness to pay for GM foods; they found that uninformed participants were susceptible to new information whereas informed participants were generally not affected by new information.

Studies about the relation between information and consumption of olive oil in Japan are merely absent. Also, combining information and country of origin is not common. In niche markets, such as Japan, olive oil has been almost linked to two countries only; Italy and Spain, which capture about 95% of total Japan imports. In this market, distinguishing olive oil by country of origin is somehow difficult; first, Spanish oil is sometimes included as part of the Italian exports (Ward et al., 2003); second, olive oil from Tunisia is exported in bulk to Spain and Italy to be re-exported as Spanish or Italian olive oil. To overcome this difficulty, this paper combines country of origin and information on the country of origin to assess consumer behaviour toward Tunisian olive oil.

This paper uses a choice experiment approach applied to a set of primary data drawn from a survey conducted in March 2009 in Japan to investigate the effect of product attributes, country of origin and related information on olive oil consumption. This paper

is organized as follows. The next section describes the methodology as data collection and survey design. The main results are reported in the third section, while the final conclusions are highlighted in the last part of the paper.

II. DATA COLLECTION AND METHODOLOGY

Data collection

A survey regarding the role of information on Japanese olive oil consumer was conducted by the NTT Resonant Inc. which provides internet research services in Japan. Total number of monitors living in Tokyo of which the company possesses was 64,993 at the time this survey was conducted. As the ratio of men to the total monitor was 47.1%; this survey introduced purposive sampling reflecting the distribution of men and women population in Tokyo prefecture. The Tokyo Metropolitan Government, Department of General Affairs reported that the total number of population in Tokyo was 12,908,856 in March 2009. The number of male population was 6,423,808 (49.8%). Randomly selected 2,670 monitors were questioned through the web-questionnaire during the last week of March 2009. A total sample of 534 persons responded to the questionnaire. According to the Information and Communications Statistics Database constructed by Japanese Ministry of Internal Affairs and Communications, internet users in Japan in 2009 were about 94,080 thousands (78.0%) of the Japanese population.

The questionnaire could be divided into three blocks. The first block included questions about olive oil consumption and purchase frequencies, quantities consumed annually, place of purchase, packaging, and important criteria for choosing olive oil. The second block includes the choice experiment questions and cards, whereas the third block includes respondents' socio-demographic characteristics. At the beginning of the questionnaire, respondents were asked whether they consume olive. Three response options were provided: 1) Yes; 2) No, but I may use olive oil if the future; 3) No, and I may not use olive oil in the future; generating the respective response frequencies: 366; 90 and 78. Only respondents who chose responses 1 or 2 (456) participated to the choice experiment.

Regarding the choice experiment, the selection of the appropriate attributes and their corresponding levels was based on a review of the relevant literature about olive oil consumption (Mili and Rodríguez, 2001; García et al., 2002; Ward et al., 2003; Mtimet et al., 2007; Dekhili and d'Hauteville, 2009); on a previous study conducted by Mtimet et al. (2009) on Japanese olive oil consumers; and on the objectives of our research. Thus, the choice experiments cards were described by four attributes: country of origin, olive oil type, price of 500 ml olive oil bottle, and taste. The selected attributes and their corresponding levels are shown in Table 2.

Table 2. Selected olive oil attributes and their corresponding levels

Attributes	Levels
Country of origin	Italy Spain Tunisia (Mediterranean)
Price (500 ml bottle)	500 Yen 700 Yen 900 Yen 1,100 Yen
Olive oil type	Extra virgin Virgin Olive oil
Taste	Bland Fruity

In the choice experiment, consumers were asked to make a choice between four alternatives: three alternatives related to three different 500ml bottles of olive oil and a fourth constant alternative of no choice (do not buy). Each olive oil bottle was described by a combination of different levels of the four attributes previously introduced. A sample choice experiment set is illustrated in Figure 1.

In the experiments, respondents were divided into two groups. Group1 was not informed about attributes details and labels, and group 2 was informed in details, particularly with regard to the country of origin. The explanations for group 2 are shown in Table 3.

Which 500 ml olive oil bottle would you like to buy?

➔ Please, check with (X) below the selected alternative

Bottle 1	Bottle 2	Bottle 3	No one
Spain	**Italy**	**Tunisia**	**I will not purchase any bottle**
Virgin	**Olive oil**	**Extra-virgin**	
500 Y	**700 Y**	**1100 Y**	
Bland	**Fruity**	**Bland**	
➡ ☐	☐	☐	☐

Figure 1. A choice experiment sample card

Table 3. Explanation of the attributes and their corresponding levels

Attributes	Levels	Explanations for respondents from group 2
Country of origin	Spain Tunisia Italy	Tunisia is located in North-Africa, in the Mediterranean Sea. It is the fourth olive oil producer in the world. Italy is the first olive oil producer in the world followed by Spain. Frequently, Italy and Spain imports olive oil from Tunisia in bulk and mix it to their own olive oil.
Type	Extra-virgin Virgin Olive oil	Extra-virgin olive oil has the best olive oil quality. Virgin olive oil is of good quality, but of lower quality compared to extra-virgin. Olive oil is of lower quality than the two previous types. It is a mixture of refined olive oil and virgin olive oil.
Taste	Fruity Bland	When you taste fruity olive oil you notice the flavor of the fruit (olive) on it. Bland olive oil has lower fruit taste and is mild.

The choice experiment model

Choice experiments derive from the theory of Lancaster (1966) as well as from Random Utility Theory (RUT). The former postulated that utility is derived from the characteristics that goods possess (bundles of attributes), rather than the good per se. Random Utility Theory states that the overall utility U_{ij} can be expressed as the sum of a systematic (deterministic) component V_{ij}, which is expressed as a function of the attributes presented (olive oil characteristics in our study), and a random (stochastic) component ε_{ij}. Individual i chooses alternative j rather than alternative k if $U_{ij} \succ U_{ik}$. In probabilistic terms, the equation is given by:

$$P_{ij} = \Pr(V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik}; \forall j \neq k \in C_i), \quad (1)$$

where C_i is the choice set for respondent i. In our study the choice set is constant and includes 4 alternatives. Equation (1) means that consumers will choose an option, from among a number of choices, trying to achieve their highest utility.

Different discrete choice models are obtained from different specifications of the density function of the error term, which correspond to different assumptions about the distribution of the unobserved portion of utility (Train, 2003). In this research we will assume that the random components are identically and independently distributed type-I extreme value across the j alternatives and N individuals, leading to the following multinomial logit model (McFadden, 1974):

$$\Pr(j) = \frac{e^{V_{ij}}}{\sum_{k \in C_n} e^{V_{ik}}} \quad (2)$$

In this study we consider the linear additive form of the utility function V_{ij} for the main effects model:

$$V_{ij} = \beta_0 + \beta_1 x_{ij1} + \beta_2 x_{ij2} + ... + \beta_n x_{ijn}, \quad (3)$$

where x_{ijn} is the nth attribute value for alternative j for consumer i, β_n represents the coefficients to be estimated, and β_0 represents the intercept or overall mean.

The estimate of consumers' Willingness To Pay (WTP) for a change in one of the choice attributes (A) from one level (i) to another level (j), ceteris paribus, that is, holding all other parameters constant except the attribute for which the WTP is being calculated, is given by the following equation:

$$\beta_{Ai} + \beta_p p_i = \beta_{Aj} + \beta_p p_j \quad \text{with } p_j = p_i + x, \quad (4)$$

where β_{Ai} and β_{Aj} are respectively the coefficient estimates of levels i and j of attribute A; β_p is the coefficient estimate of the linear price component; p_i and p_j are respectively the prices corresponding to levels i and j. Equation (4) is re-written by:

$$x = \frac{\beta_{Ai} - \beta_{Aj}}{\beta_p}, \quad (5)$$

where x is the amount of money consumers are willing to pay to shift from level i of attribute A to level j.

III. EMPIRICAL RESULTS AND DISCUSSION

Respondents provided their socioeconomic information, for instance gender, age, structure of household, level of income and education. They also responded to a series of question to determine their attitudes toward olive oil, such as consumption and purchase frequencies, purchase stores, purchase criteria and their preference.

Selected socio-economic characteristics of the sample are summarized in Table 4. Sample size is divided almost equally between men and women, indicating the same interest in olive oil for both genders. The average sample age is about 39 years old. More than half of them are married and are living with his/her partner. The average number of persons by household is 2.65 and the average number of children less than 18 years old is about 0.45. The medium income was between 4 million and 6 million yen per year. More than 53 present of the respondents graduated university.

Looking at olive oil consumption, the results indicate a high proportion of consumers (68%), and 17% of respondents indicated that they may use it in the future. 79% of sampled women are olive oil consumers, whereas only 59% of Japanese men do consume it. Young persons with age between 25 and 40 years consume more olive oil than older persons. One third of respondents (34%) consume olive oil some days during the week

and only 5% of respondents consume it sporadically. A high proportion of consumers (24%) purchase olive oil once every three months, followed by respondents who do so respectively once every six months (19%), once a month (13%) and once a year (12%).

Table 4. Selected Sample Characteristics

Characteristics	Definition	(%)
Gender	Male	49.4
	Female	50.6
Civil Status	Single	39.1
	Married	51.5
	Divorces, Widow/er	9.4
Education level	Junior high school	1.1
	Senior high school	17.6
	University	69.5
	Professional/tech. school	10.5
	Others	1.3
Household income (million Yen/year)	income ≤ 2	6.7
	2 < income ≤ 4	18.7
	4 < income ≤ 6	23.2
	6 < income ≤ 8	18.2
	8 < income ≤ 10	14.5
	10 < income ≤ 15	13.5
	15 < income	5.1
Age in years	Mean	39.3
	Min./median/mode/max.	17/38/36/76
Number of persons	Mean	2.73
in household	Min./median/mode /max.	1/3/2/8
Number of children	Mean	0.45
(< 18 years) in household	Min./median/mode /max.	0/0/0/4

Compared to Mediterranean countries, annual olive oil quantities purchased by Japanese household is still very low varying for 60% of respondents between 100 and 1,000 ml. The highest quantity purchased by household/year and observed in the sample is 18,000 ml and the lowest is 20 ml. These quantities are mainly bought from supermarkets (59%), followed by food staff shops (11%) and hypermarkets (8%). Olive oil Internet shopping buyers' proportion (5%) could increase in the near future.

Price is the most considered attribute by consumers (77%) when buying olive oil. Region or country of origin was cited secondly (37%), followed by olive oil type (35%) and bottle size (23%). Only 6% of respondents evoked sensory characteristics (taste, colour, smell, etc.). Japanese consumers prefer small sized bottles. About 25% of them prefer 500ml size, followed by the 200ml and 250ml volume with respectively 15% and 14% of respondents. The Japanese language should be present on the packaging label and

information for 39% of respondents, whereas 29% of respondents prefer the co-existence of both Japanese and English languages.

Results of the choice experiment are summarized in Table 5. Two multinomial logit models Model(1) and Model(2) were estimated and correspond respectively to the two groups of respondents: group(1) of non-informed persons, and group(2) of informed ones.

Table 5. Parameters estimates of the multinomial logit models for the two groups

Variable	Model(1) [a]	Std. Error	Model(2) [b]	Std. Error
ASC[c]	3.8885***	0.185	3.4467***	0.1532
Spain[d]	0.2711***	0.0683	0.2051***	0.0649
Italy[d]	0.6689***	0.0666	0.1923***	0.0658
Virgin[e]	-0.5609***	0.059	-0.9684***	0.0676
Olive oil[e]	-1.1300***	0.0686	-0.5867***	0.059
Price[f]	-1.5892***	0.1267	-1.9257***	0.1282
Fruity[g]	-0.0481	0.0557	0.2068***	0.0564
N. Obs[h]	7328		7264	
LL1	-1873.626			
LL2			-2022.707	
LL0	-2170.767		-2263.939	
LR1 $\chi^2_{(6)}$	594.282***			
LR2 $\chi^2_{(6)}$			482.464***	
R^2	0.26		0.2	

Note: [a] Non informed respondents
[b] Informed respondents
[c] Alternative specific constant (ASC). Coded as dummy variable that takes the value of 1 if one of the first three alternatives is chosen, and 0 when the no purchase alternative is preferred.
[d] Dummy variable with Tunisia as reference level
[e] Dummy variable with Extra-virgin as reference level
[f] Prices have been divided by 1000
[g] Dummy variable with bland as reference level
[h] Number of observations is equal to the product of the number of respondents (227) by the number of choice sets (8) by the number of alternatives (4)
*** significant at 1%; ** significant at 5%; * significant at 10%

Log-likelihood ratio tests (LR1) and (LR2) respectively for Model(1) and Model(2) indicate their overall significance (their corresponding coefficients are higher than the Chi-squared observed statistic $\chi^2_{0.01;6} = 16.8$). All coefficients of the two models are statistically significant at the 1% level, except the taste attribute for Model(1), and present the same sign. Concerning the country of origin attribute, Model(1) attribute coefficients' levels indicate a higher consumers preferences for Italian olive oil followed by the Spanish and then the Tunisian one. In Model(2), The difference between country of origin attribute levels' coefficients is lower compared to Model(1). Spanish olive oil has slightly more probabilities to be chosen than Italian or Tunisian olive oils.

Coefficients of virgin and olive oil (refined) levels are negative in both models, indicating a higher preference of Japanese consumers to extra-virgin olive oil. In Model(1)

consumers have higher probabilities to choose virgin than normal olive oil. The inverse pattern is observed in Model(2). This could be explained by the fact that informed consumers have been told that virgin olive oil has generally higher acidity compared to olive oil.

The price coefficient in both models shows a negative sign indicating a decrease in consumers' utility when prices increase. Finally, the olive oil taste coefficient attribute level (fruity) is not statistically significant in Model(1). This result was expected if we take into consideration that in a previous open question, few respondents evoked sensory attributes as an important criteria for olive oil selection. When respondents have more information about the taste attribute ("when you taste fruity olive oil, you notice the flavour of the fruit (olive) on it. Bland olive oil has lower fruit taste and is mild"), this criteria become significant in their olive oil choice (Model(2)).

Comparing the results from both models, we could notice that giving more information about olive oil characteristics to consumers (especially about the country of origin and taste) leads to changes in consumers' olive oil selection. To better appreciate the difference between the results obtained from the two groups of consumers, WTP to change from one olive oil attribute level to another have been estimated and resumed in Table 6. In addition, confidential intervals of the difference between WTP in Model1 and one in Model(2) have been estimated in Table 7. Most of WTP difference is significant except "Tunisian to Spanish". Therefore the information of attributes is an important factor affecting to consumer behaviour.

Results indicate important WTP differences between the two groups of consumers. Information supplied to group 2 consumers concerning Tunisian olive oil permitted a lower difference between the three countries preferences. WTP for shifting from Tunisian to Italian olive oil decreased by 76% (from 421 to 100 Yen/0.5 Litre), and decreased by 38% for shifting from Tunisian to Spanish one, compared to WTP estimates for group1.

Table 6. Consumers' Willingness to Pay estimates (Yen/0.5 litre)

Olive oil attribute level shifting from:	WTP (Model(1))	WTP (Model(2))
Tunisian to Spanish	170.6***	106.5***
	(0.0463)	(0.0342)
Tunisian to Italian	420.9***	99.9***
	(0.0556)	(0.0351)
Spanish to Italian	250.3[b]	-6.6[b]
Virgin to extra-virgin	352.9***	502.9***
	(0.0449)	(0.0442)
Olive oil to extra-virgin	711.1***	304.7***
	(0.0695)	(0.0349)
Olive oil to virgin	358.2[b]	-198.2[b]
Bland to fruity	-30.3	107.4***
	(0.0353)	(0.0300)

Note: [a] Price coefficient has been divided by 1000 to get real prices.
[b] Calculated as the difference between the other two levels.
Standard errors between brackets.
*** Significant at 1%; ** significant at 5%; * significant at 10%.

Informed consumers are willing to pay more to shift from virgin to extra-virgin olive oil. The extra-information increased the amount of money to be paid by 42%. It is the highest amount that informed consumers are willing to pay for all attributes levels. On the opposite side, the amount paid to shift from olive oil to extra-virgin decreased by 57%. Finally, informed consumers are willing to pay about 107 Yen/0.5 litre to shift from bland to fruity olive oil. Although this amount is among the smallest ones, it permits differentiation between olive oils and could have important influence on consumers' appreciation and repurchase of olive oil.

Table 7. Simulated confidential intervals and p-value of the difference of MWTP between Model 1 and Model 2[a]

	95% Confidential Interval		p-value [b]
Tunisian to Spanish	-199.7	63.1	0.125
Tunisian to Italian	-487.3	-179.2	0.000
Spanish to Italian	-387.2	-139.6	0.000
Virgin to extra-virgin	-293.0	-6.2	0.010
Olive oil to extra-virgin	242.9	603.3	0.000
Olive oil to virgin	412.6	718.7	0.000
Bland to fruity	39.0	248.1	0.001

Note: [a] Confidential intervals and p-values are obtained using the simulation method proposed by Poe et.al (2005). The number of trial is 10,000.
The difference is defined WTP in Model1 taking from one in Model(2).
[b] One sided test.

IV. CONCLUSIONS

The main thrust of this paper was to test how additional information on the country of origin may influence the perception of Japanese consumers toward Tunisian olive oil. The compiling of information and country of origin stems from the assumption that consumers do not have perfect or full information when choosing among different products based on the country of origin or other product attributes. Our results support the hypothesis put forward; consumers' evaluation differ significantly for all attributes according to whether the group had additional information or not. Concerning the country of origin attribute, consumers' evaluation of the Italian olive oil is highest, followed by the Spanish and then the Tunisian one. The difference of evaluation became smaller in the case of informed people. As of the results about olive oil types, extra virgin oil is most preferred especially in the informed group. The assessment of Fruity taste is higher in the case of informed group, which shows also the impact of information.

As indicated in the introduction of this paper, olive oil from Italy and Spain are dominant in the Japanese market. But recently players in the market have become more diversified. In addition, virgin olive oil imports grow rapidly despite slowdown of total import of olive oil. These market trends indicate that Japanese consumers preference for olive oils 'has become more apparent, but also more diversified. Nevertheless, the supply of information about olive oil is still limited in Japanese market. According to our results,

informing consumers about olive oil attributes affects their selection and consumption behaviour. The implications of these results are important, especially for other countries in the Mediterranean (other than Italy or Spain), which wish to do business in Japan.

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