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研究課題名（和文）Economic Analysis of Food Values: An International Comparison Study

研究課題名（英文）Economic Analysis of Food Values: An International Comparison Study

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研究成果の概要（和文）：この研究の目的は、食品を選択する際に、何を重視しているかを、日米欧を国際比較して理解することであった。

日本においては、欧米と同様に、食品を選択する際に、安全性は最重要視されているが、重要度は両国ほどではないことが、被験者から収集されたデータから分かった。また、味や価格は重視されていることも分かった。そして、栄養については、欧米に比べて重視されていないことが分かった。欧米では重視されている動物福祉は、日本においてはそれほど重要視されていないことが分かった。さらに、日本においては、食品の選択に新規性は重視されておらず、伝統に基づいていることも重要でないことが確認できた。

研究成果の学術的意義や社会的意義

本研究は、食品のマーケティング戦略だけでなく、食品や消費者政策の意思決定にも役立ちます。日本の食品メーカーは、日本の食品市場においては、食品の安全性の確保だけでなく、味や価格を重視する綿密な戦略の策定により、自社製品の差別化を図ることができるであろうことがこの研究の結果から考察できます。さらに、日本の政策決定者は、食品安全規則の厳格な実施や、高品質食品の認証システムの導入することで、食品の安全性を確保することになり、消費者に利益をもたらすことができると分かりました。

研究成果の概要（英文）：Main objectives of this study are to examine which food values are most/least important, and to analyze in what "food values" people value across three important regions of the world.

In Japan, as in Europe and the United States, safety is considered the most important factor when choosing food, but the data collected from the subjects showed that it is not as important as it is in both countries. It was also found that taste and price were considered important. We also found that nutrition is not as important as in Europe and America. It turns out that animal welfare, which is considered important in Europe and the United States, is not so important in Japan. Furthermore, it was confirmed that in Japan, novelty is not important when selecting food, and being based on tradition is not important either.

研究分野：食料経済

キーワード：Food Values Economic Analysis International Comparison Stated Preference Method Sustainable Food Organic Food

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1. 研究開始当初の背景

Scientific background for this research, and the “key scientific question” comprising the core of the research plan,

The food systems in Asia, the United States (US) and Europe significantly differ in agricultural production practices, agricultural policy and marketing of foods. Consumer preferences could also differ due to several factors such as cultural and socioeconomic factors, among others. For example, tolerance to the use of genetically modified organisms (GMOs) and growth hormones in food production generally differ across these regions although coexistence of global and local food marketing channels has been commonly observed in these three regions. There have not been any direct comparison studies however that compare consumer preferences across Asia, the US, and Europe. This proposal will assess differences in consumers’ preferences for more abstract food quality attributes or so called “food values” across these three parts of the world using stated preference methods. The food values that will be examined are naturalness, taste, price, safety, convenience, nutrition, novelty, origin, fairness, appearance, environmental impact and animal welfare. Hence, these food values include credence, experience, and price attributes. Naturalness and safety are considered credence attributes since they are product characteristics that consumers cannot really detect just by looking at the product without any label information. Credence attributes are included in the set of food values that are related to sustainability and ethical issues such as environmental impact, origin, animal welfare, naturalness, safety, and fairness. Taste and appearance are experience attributes while nutrition is a credence attribute related to the nutritional content of the food products. Novelty and convenience can also be considered experience attributes.

Preference valuation methods can be grouped into two categories: stated preference methods and revealed preference methods. Given that we are focusing on “food values” which are abstract food quality attributes in this study, and not specific food products, we will be using stated preference methods which are a popular way of assessing people’s preferences. Numerous studies have used stated preference methods in preference valuation studies.

2. 研究の目的

Main objectives of this study are to examine which food values are most/least important, and to analyze in what “food values” people value across three important regions of the world. The pandemic limited the scope of our studies on food values to expand. We tried our best to make a progress. We planned to conduct a study in each region. Because of difficulty in international research trips, we collaborated with local researchers to conduct a smaller scale study to examine the consumers’ willingness to pay for the premium prices on organic food and certified authentic and traditional food. We also utilized the results from the existing studies targeting in different parts of the world for international comparisons. By testing similar hypotheses, we have been able to compare our results from our studies in Japan with the studies in North America and Europe.

3. 研究の方法

The best-worst scaling (BWS) stated preference approach was used in this project. It consists of a series of choice sets where respondents are asked to indicate among a (sub)set of attributes or statements which one they prefer the most (or consider the most important) and which one they prefer the least (or consider the least important). BWS is a popular methodology that has been implemented in several research fields such as psychology, marketing, and social and environmental sciences. BWS is popular due to the fact that it provides several advantages over other common rating-based methods such as the Likert scale. In BWS, individuals can respond to the question only in one way, indicating which value is the most important and which one is the least important. This method forces individuals to make choices among values of the scale and does not allow the possibility to give the same value to all the issues in question. With BWS, we can construct individual-level scales of preference/importance for each issue under consideration and accurately compare these scales (Bazzani et al. 2018).

There has been development of understanding in consumer behavior using food value

concepts. One of them is related to consumers' sustainable food choices. Determinants for sustainable food choices were examined for the case of Japan and compared to the cases of other countries.

4 . 研究成果

Here, the results from the Best-Worst study are presented for the food in general and the sustainable food.

(1) Best-Worst Counts for the food in general

We conducted online BWS choice experiments for Japan and compared the results from the United States and Europe (Bazzani et al., 2018). The food value information as well as demographical data were collected from a sample of 3,000 persons from all the regions and all the age groups considering geographical and generational representations in Japan. This was to compare the food values for the economies with different stages of economic development in different regions of the world. The following results on food values have been obtained from the survey of 3,000 respondents.

Aggregation results

Food value	B	W	BW	Rank
Naturalness	3311	2245	1066	6
Safety	7845	593	7252	1
Environmental impact	1174	2743	-1569	8
Origin	3519	2024	1495	5
Fairness	1025	3996	-2971	10
Nutrition	4581	1069	3512	4
Taste	5702	723	4979	2
Appearance	1420	4036	-2616	9
Convenience	2972	3623	-651	7
Price	5584	1603	3981	3
Animal welfare	685	4154	-3469	11
Novelty	602	6512	-5910	13
Tradition	580	5679	-5099	12

Results from Best-Worst scores using the modeling method

Conditional logit max diff model

	Estimate	z-value	p-value
Naturalness	1.41412	66.51	<2e-16
Safety	2.62985	112.182	<2e-16
Environmental impact	0.87013	42.128	<2e-16
Origin	1.48787	69.933	<2e-16
Fairness	0.59344	28.661	<2e-16
Nutrition	1.86227	85.428	<2e-16
Taste	2.16595	96.792	<2e-16
Appearance	0.7126	33.773	<2e-16
Convenience	1.087	51.96	<2e-16
Price	1.97825	89.77	<2e-16
Animal welfare	0.4769	23.235	<2e-16
Tradition	0.17278	8.227	<2e-16

Rho-squared = 0.1792859

Adjusted rho-squared = 0.179162

Akaike information criterion (AIC) = 159097

Bayesian information criterion (BIC) = 159199.9

Number of coefficients = 12

Log likelihood at start = -96911.36

Log likelihood at convergence = -79536.52

International comparison based on the Share of Preference (SP) (Comparison with Bazzani et al. (2018 : Table 4))

Rank	USA		Norway		Japan	
	Food value	SP	Food value	SP	Food value	SP
1	Safety	0.380	Safety	0.313	Safety	0.240
2	Price	0.115	Naturalness	0.125	Taste	0.151
3	Taste	0.112	Taste	0.112	Price	0.125
4	Nutrition	0.088	Animal welfare	0.098	Nutrition	0.111
5	Naturalness	0.078	Nutrition	0.094	Origin	0.077
6	Animal welfare	0.077	Price	0.074	Naturalness	0.071
7	Environmental impact	0.039	Fairness	0.060	Convenience	0.051
8	Fairness	0.028	Origin	0.047	Environmental impact	0.041
9	Appearance	0.027	Environmental impact	0.046	Appearance	0.035
10	Origin	0.026	Appearance	0.018	Fairness	0.031
11	Convenience	0.020	Convenience	0.011	Animal welfare	0.028
12	Novelty	0.012	Novelty	0.002	Tradition	0.021
13					Novelty	0.017

Sources: USA and Norway (Bazzani et al., 2018) using the random parameters logit; Japan (Authors, 2023) using conditional logit method

Safety of food is considered most important for Japanese consumers. However, the magnitude of the importance is not as high as the counterparts in the United States and Europe. Nutrients are not considered as important as these areas in Japan. A similar result can be found for animal welfare, novelty and fairness. Tradition is not considered important. Non-importance of appearance is a common reaction among the three groups of consumers. The characteristics that are not considered more important than the other two groups are convenience and production origin. Non-significant characteristics are different among three groups with the exception of unpopular factor of novelty.

We have been able to derive the following findings and conclusions.

- Safety of food is considered most important for Japanese consumers. However, the magnitude of the importance is not as high as the counterparts in the United States and Europe. Nutrients are not considered as important as these areas in Japan. A similar result can be found for animal welfare, novelty and fairness. Tradition is not considered important.
- Non-importance of appearance is a common reaction among the three groups of consumers. The characteristics that are not considered more important than the other two groups are convenience and production origin.
- Non-significant characteristics are different among three groups with the exception of unpopular factor of novelty.

(2) Best-Worst Counts for the sustainable food

In the second phase of the food value study, the food values for sustainable foods were examined. The ranking is shown in the below. "Previous ranking" in the table lists the order of consumer preferences among food values for the food in general obtained in the first phase of this study.

Best Worst scores (B-W) and ranks for sustainable foods

Values	B	W	BW	Ranking	Previous ranking	Notes
naturalness	4342	2036	2306	3	6	
safety	7626	609	7017	1	1	
environment	2314	1985	329	7	8	
origin	3628	2406	1222	5	5	
fairness	2125	3549	-1424	10	10	
healthiness	3208	1863	1345	4	-	Nutrition was 4th

seasonality	2099	3345	-1246	9	-	New element
taste appearance	3208	2413	795	6	-	Taste was 2 nd Appearance was 9th
convenience	2593	3394	-801	8	7	
price	5051	2087	2964	2	3	
Animal welfare	1179	3835	-2656	11	11	
novelty	881	6473	-5592	13	13	
tradition	746	5005	-4259	12	12	

For the sustainable food, consumers do not change their food values in Japan. The ranking was not much different from the case for the food values for the food in general. Safety remained the most important value for the Japanese consumers. Price becomes more important for the sustainable food. Naturalness and healthiness are also important. The high recognition of naturalness and healthiness is unique for the sustainable food.

(3) Scientific and social significance of the research achievements

This study is useful not just for food marketing strategies but also for food and welfare policy decision making. In the Japanese food market, the food manufacture can differentiate own products from others by taking careful strategies to emphasize on the importance of food taste and pricing besides food safety. Policy decision makers can also benefit consumers with policies to secure food safety by introducing strict enforcement of food safety rules and certification systems for recognizing high food quality.

5. 主な発表論文等

〔雑誌論文〕 計1件（うち査読付論文 0件／うち国際共著 0件／うちオープンアクセス 1件）

1. 著者名 Masahiko Gemma	4. 巻 1
2. 論文標題 Global Food Security, and Economic and Agricultural Development	5. 発行年 2023年
3. 雑誌名 Sustainable Development Disciplines for Society (Springer)	6. 最初と最後の頁 221-229
掲載論文のDOI（デジタルオブジェクト識別子） なし	査読の有無 無
オープンアクセス オープンアクセスとしている（また、その予定である）	国際共著 -

〔学会発表〕 計3件（うち招待講演 3件／うち国際学会 0件）

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2. 発表標題 Recovery from the COVID 19 Pandemic: Case of the Japanese Agricultural and Food Sector
3. 学会等名 The 20th Asia Pacific Agricultural Policy (APAP) Virtual Forum (招待講演)
4. 発表年 2021年

1. 発表者名 Masahiko Gemma
2. 発表標題 GHG Emission Reductions in Agriculture and the Food System to Avoid Disastrous Climate Change
3. 学会等名 The 21st Asia Pacific Agricultural Policy (APAP) (招待講演)
4. 発表年 2023年

1. 発表者名 Masahiko Gemma
2. 発表標題 Policy Leverage and Enabling Measures in Agricultural Supply Chains Digital Technologies
3. 学会等名 The 22nd Asia Pacific Agricultural Policy (APAP) (招待講演)
4. 発表年 2023年

〔図書〕 計0件

〔産業財産権〕

〔その他〕

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6. 研究組織

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7. 科研費を使用して開催した国際研究集会

〔国際研究集会〕 計0件

8. 本研究に関連して実施した国際共同研究の実施状況

共同研究相手国	相手方研究機関			
米国	Texas A & M			
韓国	Korea University			