The study on the influencing factors of brand awareness of Regional Public Brand of Agricultural products-- based on a baseline survey of 409 consumers in China

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Abstract: The regional public brand of agricultural products is an important type of agricultural product brand. There are many successful examples of such brand in the world. The purpose of this paper is to study the factors influencing consumers' brand awareness of regional public brand of agricultural products. First, reliability, validity and factor analysis were carried out. Then FGLS was carried out for the extracted factors and other variables, and robustness test was carried out with binary Probit and Tobit regression models. The main results are as follows: First, brand influence, brand publicity and product quality all have a positive impact on the consumer awareness of regional public brand of agricultural products; Second, brand influence has an both economic and statistical significant impact on the awareness of regional public brand of agricultural products; Third, there are significant differences between men and women in the awareness of regional public brand of agricultural products.

1. Introduction

As an important type of agricultural product brand, the regional public brand of agricultural products is based on the distinct natural or industrial resources in a specific region, owned by relevant organizations in the region and used by several agricultural producers and operators. In 2017, Central Document No.1 in China pointed out that the construction of regional agricultural products public brand should be promoted. Now the brand has covered many important agricultural products such as grain, oil, vegetables and fruits. There are also many successful regional public brand representatives of agricultural products in the world, such as Edward potato, Newcastle orange and New Zealand kiwifruit.

This paper mainly studies the factors that influence consumers' awareness of the regional public brand of agricultural products. Regional public brand of agricultural products is an important branch of regional brand construction, which not only has a great leading effect on the development of regional economy, but is an important means for enterprises and farmers to increase income. However, the researches on agricultural brands in China lack of the perspective of consumers, and the construction of public brands in some regions still stays at packaging, which is basically symbolic image packaging and lacking in the thinking of consumers. Therefore, this issue needs to be further discussed.

2. Research Method

2.1 Descriptive statistics

After defining the relevant variables, descriptive statistical method was used to analyze the brand awareness, the influencing factors of the brand (such as price and quality perceived by consumers) and social factors (such as gender and age).

In this paper, the predicted variable brand awareness is a binary variable, which can be transformed by the equation E (brand awareness) = P (brand awareness = 1|x), so that the virtual variable has both the characteristics of continuous metric variable and ordinal variable at the same time.

2.2 Factor analysis

According to the n influencing factors of brand awareness of regional public brand of agricultural product, an explanatory variables can be constructed. However, brand awareness may be affected by some unknown public factors besides some specific factors. Therefore, this study first used exploratory factor analysis.

The factor analysis model of an observation variables-x is:

$$x = f \, \Delta' + e \tag{1}$$

In formula (1), f is the common factor and Δ' is the factor load. The correlation coefficient matrix of x can be decomposed into:

$$\Sigma = \Delta \varphi \Delta' + \sigma \tag{2}$$

In formula (2), for the unrotated factor $\varphi = 1$. Among them, φ is called special degree that is the part that n observation variables do not belong to the commonness.

Factor analysis was carried out for n influencing factors. First, the principal component factors were obtained. According to the eigenvalue greater than 1 and explanatory variance, the principal components were selected based on the gravel map and KMO and SMC tests were carried out. Next, the factor structure was further simplified by rotation, and the visual load map was used. Then, the correlation coefficients of Spearman and Kendall were calculated to check whether the principal components are related and present the results finally.

2.3 Econometric analysis

In this paper, Feasible Generalized Least Squares was used to establish the model. According to the principle of multivariable linear regression model and factor analysis above, the following formula is constructed:

$$Y_i = \beta_{i0} + (\beta_{i1}x_1 + \beta_{i2}x_2 + \ldots + \beta_{ik}x_k) + (\beta_{i(k+1)}x_{i(k+1)} + \beta_{i(k+2)}x_{i(k+2)} + \ldots + \tag{3}$$
$$\beta_{i(k+q)}x_{i(k+q)}) + u$$

In formula (3), i represents the i th respondent. Y_i Represents the brand awareness of the regional public brand of agricultural products of i Th respondent. $x_1, x_2 \cdots x_k$ Represent the k common factors extracted from factor analysis. $x_{i(k+1)}, x_{i(k+2)} \cdots x_{i(k+q)}$ Represent k social statistical variables. β Represent the estimated coefficients and intercept of the explanatory variables, and u is the random error term.

Then probit model and Tobit model were used to test the robustness. The basic form of binary probit model is:

$$P (Y = 1) = f (x) \tag{4}$$

In formula (4), the explained variable y is a 0-1 variable and f (x) follows the standard normal distribution.

Tobit model can be simplified as:

$$y = \max(0, \; \beta'x_i + u_i) \tag{5}$$

In formula (5), x_i is the independent variable vector. β' Is the coefficient vector. The errorterm u_i is independent and follows the normal distribution: $u_i \sim \mathrm{N}\,(0, \sigma^2)$.

3. Research Results

The sample of this survey is Chinese consumers and the questionnaire is distributed online. The respondents filled in the questionnaire according to their real situation and cognition. The questionnaires were issued on April 28, 2019 and collected them on May 10, 2019. There were 409 questionnaires were collected in total, with an effective rate of 100%. The sample cover 22 provinces in China.

This paper used regression analysis to analyze the impact of brand characteristics on the regional public brand of agricultural products. Firstly, FGSL regression was used to analyze. FGLS is relatively easier to satisfy than Gaussian Markov Assumption in OLS, and there is no difference in results between FGLS regression and OLS regression if one of the following conditions is satisfied: First, the perturbation terms of the equations are not correlated with each other; second, each equation contains exactly the same explanatory variables. In this paper, the two conditions were both met. So FGLS was chosen as the core model. Secondly, Binary Probit Model was selected as the robustness test to further explore the robustness and rationality of FGLS model. Thirdly, Tobit Model was used to modify the range of the explained variables. Because the explained variable is a virtual variable, its value range is limited to 0~1, but the first two models do not meet this condition. With Tobit regression, the rationality of FGLS model could be tested while the range of values is reasonable.

Table 1. Results of parameter estimates for each variable-FGLS, Binary Probit Model and Tobit Model

Variables	FGLS	Binary Probit Model	Tobit Model
Dimensions of brand impact	0.114***	0.118	0.087
	(0.026)	(0.178)	(0.022)
Dimensions of brand promotion	0.078	0.109	0.029
	(0.103)	(0.097)	(0.025)
Dimension of product quality	0.020	0.031***	0.014***
	(0.029)	(0.020)	(0.022)
Sex	0.124**	0.335***	0.124**
	(0.052)	(0.112)	(0.052)
Age	0.049	0.130***	0.049***
	(0.049)	(0.046)	(0.017)
Income	0.023	0.069	0.023
	(0.023)	(0.025)	(0.026)
Cons	-0.076	-1.573***	-0.076
	(0.103)	(-0.061)	(0.103)
Obs	409	409	409

Note: The standard error is in the parentheses in the column-FGLS. The average marginal effect is in the parentheses in the column-Binary Probit Model. The robust standard error is in the parentheses in the column- Tobit Model. "*""**" "***" indicates that the significance level of the coefficient is 10%, 5%, 1%.

According to the results of FGLS, the estimated coefficients of brand impact, brand promotion and product quality are all positive, indicating that all three factors have positive effects on the brand awareness of regional public brand of agricultural products. The estimated coefficient of brand impact is 0.114, which shows that while other factors remain unchanged, the brand awareness of the consumers of regional public brand of agricultural products is expected to increase by 0.114 for every additional unit of brand impact, and the coefficient shows statistical significance at the 1% significance level. The estimated coefficient of the control variable sex is 0.124, which indicates that

while other factors remain changed, the brand awareness degree of male is 0.124 higher than that of female, and the coefficient is statistically significant at 95% confidence. This result is consistent with the previous research, but the confidence level is lower than that of the previous research 99% (Zhang Shaokai et al., 2010). The specific reasons resulting this difference may be the existence of missing variables and insufficiency of the sample size.

Through the robustness test of Binary Probit Model, it is found that the sign of regression coefficient is exactly the same as that of FGLS Model. Both are positive signs, which shows the dimensions of brand impact and brand promotion, the product quality dimension all have a positive influence on brand awareness of regional public brand of agricultural products, in which the coefficient of the product quality dimension is significant at 1% significance level. The coefficient is 0.031, the average marginal effect is 0.020, that is, when the product quality dimension increases by 1 unit, the regional public brand awareness level of agricultural products increased by 0.020 on average. Through Tobit Model, it is found that the sign of regression coefficient is exactly the same as that of FGLS Model and Binary Probit Model, which indicating that the positive effect is robust. In addition, the test of inflation factor shows that the VIF is less than 10 and the Spearman Correlation Coefficient and Kendal Correlation Coefficient are both less than 0.4, so there are no serious autocorrelation problems.

4. Conclusion

Based on the results above, the factors influencing brand awareness of regional public brand of agricultural products are summarized as follows:

First, brand impact has significant influence on the brand awareness of regional public brand of agricultural products in both economic and statistical sense. For every 1 unit increase of brand influence, the brand awareness degree of regional public brand of agricultural products is expected to increase 0.114 on average, and the estimated coefficient is significant at the level of 1%. It shows that utilizing various methods to increase the influence of regional public brand of agricultural products is essential to improve consumers' brand awareness.

Second, sex also has an impact on the brand awareness of regional public brand of agricultural products. While other factors remain unchanged, men's awareness of regional public brand of agricultural products is 0.124 higher than women's on average. This may be due to that the regional public brand of agricultural products has some policy backgrounds and men generally pay more attention to relevant information so that they have more opportunities to learn about the brand.

At the same time, this paper still has some deficiencies which can be divided into two main aspects: research data and research content. In terms of research data, it is debatable that only 409 samples were used to represent the Chinese consumers. In addition, the number and form of control variables need to be further improved. In terms of research data, logical relationships that reveal how each kind of influence factors affects the brand awareness of consumers can also be further studied.

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