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Consumers' Willingness to Pay More for Shrimps in Suburban Mumbai

Shyam S. Salim

Central Marine Fisheries Research Institute, Cochin - 682 018, Kerala

Abstract

The study has been conducted with the objectives of finding whether the consumers are willing to pay more for shrimps in an suburban area of Mumbai, and if so, how much and what are the factors behind it. The study has revealed that the consumers are willing to pay a price higher than the market price of shrimps. The five factors behind their willingness to pay more for shrimps are: taste and preferences, lower prices, high nutritional value with low fat-content, proximity (easy access), and familiarity with a shop, in that order. The factor 'taste and preference' has been found so dominating that consumers are willing to pay even ` 500/kg in comparison to the prevailing market price of`` 225± 25/kg. The willingness to pay a higher price for other attributes varied from ` 400/kg to ` 280/kg. Out of the five determinants, two, viz 'taste and preferences' and 'nutrition' have been found statistically significant. And therefore regression analysis has been carried out for these two variables using Tobit model.

Key words: Willingness to pay, Tobit model, contingent valuation, shrimps

JEL Classification: Q22

Introduction

Shrimps are premium commodities and have been making a contribution of 35-40 per cent to the total earnings by way of exports for the past two decades (Salim *et al*., 2004). Being largely an export commodity, the prices of shrimps are generally high in the domestic market. Therefore, there have been apprehensions that shrimps are not available for the domestic consumers. It is also felt that the exporters are hesitant to sell the premium shrimp in the domestic market due to cashing in on the export economies of scale (Salim and Biradar, 2009). Shrimps are preferred as a food commodity because of its low fat content (4-8% on dry matter basis) as compared to chicken (6-23%) and mutton (8-11%) (Ackman, 1967; Cowey and Sargent, 1977). The price of shrimps is also lower than mutton but higher than chicken prices.

This study was conducted to find the preference of people in Mumbai towards the consumption of shrimps as compared to chicken and mutton. The specific objectives of the study were to analyze the factors affecting the consumers' willingness to pay more for shrimps and to evaluate the consumers' willingness to pay maximum for shrimps by measuring the probability and elasticity of willingness to pay.

Data and Methodology

To study the preference of consumers for fish and willingness to pay (WTP) for shrimp and their determining factors, the primary data were collected from the Andheri ward in Mumbai suburbs. Andheri was purposively selected on account of being a major ward having proximity to the resources and diversified population across all income groups. Two hundred and forty respondents were selected randomly and the price data were collected during September 2009. The average price of shrimps during the selected week was

* Email: shyam.icar@gmail.com

` 225+25/kg. To find the consumers' WTP for shrimps, the limited dependent variable technique was used since the values for the survey respondents WTP are either zero or some value greater than zero. The contingent valuation technique and the Tobit regression model were applied.

Mathematically, the Tobit model is expressed as given below :

$$y^*_i = X_i\beta + \varepsilon_i$$

$$y_i = y^*_i, \quad \text{if } y^*_i > \text{market price}$$

$$y_i = 0, \quad \text{if } y^* \leq \text{market price}$$

where, y^*_i is the latent dependent variable, y_i is the observed dependent variable, X_i is the vector of the independent variables, β is the vector of coefficients, and ε_i is the error-term and that is assumed to be independently normally distributed: $\varepsilon_i \sim N(0,\sigma)$.

The consumers were asked about the attributes for which they would be willing to pay more for shrimps. From the survey, it was recorded that the determinants of demand were taste and preference, nutrition aspect (low fat), proximity to home, lower price as compared to other non-vegetarian commodities and familiar shop. Each consumer was asked to rank the determinant of demand in order of preference. They were then asked how much they were willing to pay for one kg of shrimps for their most preferred determinant of demand. It could be either market price on that day or more than the market price, if it was fresh. For Tobit regression, the value of WTP equals to the market price was taken as zero and more than market price value was taken as such for calculations.

Results and Discussion

Demographic Profile of Sample Respondents

The respondents were divided into two groups based on two characteristics, viz., income level and educational level. For136 consumers, the income level was between ` 25, 000 and ` 75, 000, for 80 consumers, it was between ` 75,000 and ` 2 lakh and for 24 consumers it was ` 2-4 lakh (Table 1). Thus, as income level increased, the number of consumers decreased. Therefore, it was preferred more across low-income segment of the society.

Table 1. Incomelevel of sample respondents in Mumbai

Income level (`)	No. of consumers	Percentage of consumers
25,000-75,000	136	56.67
75,000-2,00,000	80	33.33
2	24	10.00

On considering the educational level, it was found that all the respondents were literate (Table 2). About 16 percent of the consumers had primary school level education, 53 percent had secondary level education and 30 percent had studied in a college (Table 2).

Table 2 Educational level of sample respondents in Mumbai

Education level	No. of consumers	Percentage of consumer
Primary education	40	16.67
Senior (10+2) secondary education	128	53.33
College education	72	30.00

Ranking of Determinants and Corresponding Willing to Pay Price for Shrimps

The ranking of sample respondents for the 5 identified determinants, viz. taste and preference, relative price, nutrition, proximity and familiar shop is recorded in Table 3 along with the maximum price the consumers were willing to pay for it. A perusal of Table 3 reveals that, 108 consumers regarded 'taste and preference' as the most preferred determinant for buying shrimp and because of it they were willing to pay the maximum price even up to ` 500/kg and their average WTP was ` 246 /kg. For 64 consumers, the determining factor for shrimp purchase was its relative lower price and they were willing to pay a maximum price of ` 400/kg for it and the average WTP was ` 219/kg.

Surprisingly, low-fat 'nutrition' which is the special characteristic of shrimp, was given the first rank as determinant for purchase by only 52 consumers (≈22%). The maximum WTP price quoted by these consumers was also lower at ` 300/ kg with the average WTP price of ` 211/ kg. For 12 consumers, 'proximity' was the most preferred determinant for purchase of shrimp and because of it their maximum WTP price

Table 3. Rank and WTP price for shrimps for selected determinants

Determinant	Frequency as first choice	Percentage of sample opting first choice	Maximum WTP price (`/ kg)	Average WTP price (`/kg)
Taste & preference	108	45.00	500	246
Relative lower price	64	26.67	400	219
Nutrition (low fat)	52	21.67	300	211
Proximity	12	5.00	260	221
Familiarity of shop	4	1.67	280	240

Table 4. Regression estimates of multivariate Tobit model for taste and preference

Variable	Parameter estimates	t-value	Elasticity
Age	-1.0423	-1.9723**	-2.0052
Income	0.4422	3.0473***	1.2749
Family size	-2.2908	-4.3315***	-0.6605
Education	0.2193	0.8752	0.6324
Cleanliness	0.5505	0.1286	1.5872
Value of R^2	0.894		

Note: ******and ******* **i**ndicate significance at 5 per cent and 1 per cent levels, respectively

was ` 260/ kg and the average WTP price was ` 221 / kg. For four consumers, 'familiarity of shop' was the determining factor for purchasing of shrimp and the maximum WTP price offered by them was ` 280/kg and the average WTP price was ` 240/ kg.

Tobit Model

The Tobit regression was estimated for each determinant. Out of five, statistically significant results were obtained only for two determinants, viz. 'taste and preference' and 'nutrition' (low fat). The independent variables that affected these determinants were age, income, family size, educational level and cleanliness.

(a) Taste and Preference

The results of multivariate Tobit analysis for taste & preference for shrimps are presented in Table 4. Based on taste and preference, it was found that the variables age and family size were inversely related and income and education were positively related to WTP a higher price for shrimps. The value of R^2 indicates that 89.4 per cent of the variations in the dependent variable were explained by the selected independent variables involved in this analysis.

Since direct interpretation of various regression parameters given in the Tobit model is not easy, these parameters were converted into elasticity for interpretation. It was also observed that one per cent increase in the age will decrease the WTP price for shrimps based on taste & preference by 2.0 per cent *ceteris paribus*. Similarly, one per cent increase in the income will increase the value of WTP for shrimps by 1.27 per cent and one per cent increase in the family size will decrease the WTP price for shrimps by 0.66 per cent *ceteris paribus*.

(b) Nutrition (Low Fat)

The regression results for multivariate Tobit model for nutrition (low fat) of shrimps are presented in Table 5. Based on the nutritional aspect, the variable age was found to be negatively related and the variables, income and prices of substitutes were positively related to the WTP price for shrimps. The R^2 value indicates that 72.6 per cent of the variations in the dependent variable could be explained by the independent variables involved in the analysis.

Table 5. Regression estimates of multivariate Tobit model for nutrition (low fat)

Variable	Parameter estimates	t-value	Elasticity
Age	-0.6562	-1.835**	-0.6539
Income	0.8487	2.7133***	0.8458
Family size	0.4670	0.810	0.4654
Education	0.2033	0.579	0.2026
Price of substitutes	0.3487	1.835***	0.6452
Value of R^2	0.726		

Note: ******and *** indicate significant at 5 per cent and 1 one per cent levels, respectively.

It was also observed that one per cent increase in the age would decrease the WTP price for shrimps by 0.65 per cent, while one per cent increase in income will increase the WTP price for shrimps by 0.84 per cent based on nutrition (low fat) *ceteris paribus*.

Conclusions

The study on the consumers' willingness to pay more for shrimps has revealed that the consumers are willing to pay a price higher than the market price of shrimps. The rank and WTP price for selected determinants offered by the respondents have indicated that 'taste and preference' is the most choiced determining factor for consumers willingness to pay more. The results of multivariate Tobit analysis for taste and preference for shrimps have indicated that age and family size of respondents were inversely related and income and education were positively related to WTP a higher price for shrimps.The results for multivariate Tobit model for nutrition (low fat) of shrimps have shown that age of respondents was negatively related and income and prices of substitutes were positively related to the WTP price for shrimps. The study has concluded that there exists a considerable domestic demand for shrimps with high consumer surplus.

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