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The fish demand at fish auction sites in Lampung: Implementation of the Quadratic Almost Ideal Demand System (QUAIDS) model

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ABSTRACT: The purpose of this paper was to discuss the factors influencing fish demand in Lampung Province. Data were collected by observing fishing fields in the subject area. This study was carried out to examine the correlation between demand and fish nutrition, which is more complicated than other sources of protein. Hence, it explains the reason for the lack of nutrition in Lampung Province. Researchers used three stages of estimation in examining the model, which was called the Quadratic Almost Ideal Demand System (QUAIDS). At the first stage of estimation, the results showed that the model used was relatively good. The coefficient estimated value of food expenditure was positive, and it had a significant effect on its coefficient determination at 96.8%. Next, the research showed a negative factor value for the fish consumption model, indicating that the lower the price, the higher the demand, and vice versa, positioning at 90.5%. Last, the model showed that the variables of price, income, and expenditure did not affect the total demand, but the number of household members had a significant influence on it.

Keywords: fish auction, demand and QUAIDS model

1 INTRODUCTION

The potency of fishery resources in Lampung Province in 2016 reached about 65 million tons/year; 7.4 and 57.6 million tons/year for fishing and farming, respectively. To Indonesians, this was a foundation for developing and transforming the economy to create jobs, foreign exchange, and income and to supplement national food reserves. National food and nutrition endurance links social sustainability, economics, and political stability.

Lampung has high potency in its fishery due to its geographical conditions. The natural border on the west, east, and south of Lampung is the ocean. Unfortunately, however, fish consumption in Lampung is considerably low.

Figure 1. Average fish consumption in Lampung and across Indonesia (kg/year).

2 LITERATURE REVIEW

The QUAIDS model is commonly used in consumer behavior assessment. Generally, the demand function states the relationship between the quantity requested, and the factors are the place and time. The demand function is integrated in two ways: (1) maximizing customer satisfaction within the constraints in the budget and the price; (2) minimizing the cost and increasing the output at the fixed income level. The QUAIDS model is the generalization of the preferred class. Indirectly, the function of the Piglog utility is:

$$\text{Log V} = \left\{ \frac{[\log x \log a(p)]}{b(p)} - 1 + \lambda(\text{p}) \right\}^{-1}$$

Notes: x is the total spending; p is the price vector; a(p) is the homogenous function degree one in price; and b(p), as well as λ(p), is the zero degrees uniform function in price.

3 METHODS

In the first step, consumers allocated their income for food and non-food spending. In the second step, they allocated their income for fishery and non-fishery products. In the third step, fishery expenditure was approached with the QUAIDS model.

At the first step, the model used was:

$$\text{Ln(M)}_i = \alpha + \gamma \text{Ln(Pi)}_i + \beta \text{Ln(X)}_i + \sum \theta \, Z_i + \varepsilon \qquad (1)$$

M is the total spending for a household in a month M (Rp/Kap/month); Pi is the price index for food (Rp); X is the family income (Rp/Kap/month); and Z is the demographic variable (the number of members in the family and the amount of spending for food). At the second stage, the demand function was determined by:

$$F_i = \alpha + \sum \gamma \, \text{Ln(Pi)}_i + \beta \, \text{Ln(M)}_i + \sum \theta \, Z_i + \varepsilon \qquad (2)$$

F is the total spending on fisheries (Rp/kap/month); Pi is the food price index I; M is the total spending on food (Rp/Kap/month); and Z is the demographic variable (the number of members in the family and the amount of spending for fish). In the third step, all the spending for the fishery was approached using the QUAIDS model. The function was as follows:

$$S_i = \beta_1 \, \text{LnP}_i + \beta_2 \, \text{Ln(F/I)}_i^2 + \beta_3 \, \text{Ln(X)}_i + \beta_4 \, \text{Ln(JRT)}_1 + \varepsilon \qquad (3)$$

S is the weekly demand (Kg); Pi is the fish price of I (Rp); F/I m is the spending on 'the stone model' pricing (Rp); X is the spending (Rp); TJR and JRT are the number of people in households (persons).

4 RESULTS

4.1 *Reporting research results*

The model used in the stage is good. The determinant coefficient shows at 96.8%, and the price index is significantly affected by the food; then it shows that the higher the price of the product, the higher the spending.

Table 1. The predicted result for the spending model in stage 1.

Variables	Parameter Expectations
Food Price Index	0.33177 **)
Income	0.02110
JRT	0.02413
D1 (price of fish)	0.04880
Spending	0.66984

The determinant coefficient is 96.8%.
*) Significant at 99%

The model used in stage 2 shows a good result. The coefficient determinant is 90.5%. At this stage, the expected immitant is negative. It means people would substitute the fish with the other product if the price increment happens.

Table 2. The estimation result for stage 2.

Variables	Parameter Expectations
Group of P.Ikan	0.91026
Index	−0.2038
M	−0.043
JRT	0.08366
D1 (price of fish)	−0.312 *)

The determinant coefficient is 90.5%.
*) Significant at 95%

The model result in stage 3 is excellent. The determinant coefficient is 94.2%. At this stage, it is estimated that the number of households would provide a positive effect. At this stage, it shows that the greater the population, the higher the demand for fish. Within this model, it is concluded, the shape of quadratics does not determine the fishery in Lampung.

Table 3. The estimation results in stage 3.

Variables	Parameter Expectations
S	3.431
P	0.0340
(F/I)2	−0.00924
X	1.0927
JRT	9.7419**)

The determinant coefficient is 94.2%.
*) Significant at 99%

5 DISCUSSION

The government is encouraged to build more ideal fish markets or auction centers that are easily accessible for the local community to help to increase fish consumption. Lampung Province has significant potential to develop its fish market. This would then improve the

productivity of the fishery sector as well as the socialization of fish consumption. Furthermore, it creates social awareness of the importance of protein from fish products. Ultimately, it is expected to improve fish consumption at the provincial level to reach the target of national nutrition endurance.

6 CONCLUSION

1. The price and spending variables are not affecting demand. The number of households significantly affects demand. Price and income have no significant effect on demand.
2. The model of fish demand is not quadratic.

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