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ELASTICITY OF DEMAND FOR VANAME SHRIMP PRODUCTS (*Litopenaeus vannamei*) IN BANDAR DJAKARTA ANCOL

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ABSTRACT

This study aims to analyze the factors that affect the demand for processed vaname shrimp products (*Litopenaeus vannamei*) and how much the elasticity of demand for processed vaname shrimp products (*Litopenaeus vannamei*) in Bandar Djakarta Ancol. This research was conducted in August 2019 to September 2019. The method of this research is a quantitative descriptive method using multiple linear regression analysis models. The sampling technique used in this study uses primary data with accidental sampling technique. The results showed that the factors that influenced the demand for vaname shrimp (*Litopenaeus vannamei)* were vaname shrimp prices, lobster prices, crab prices, squid prices, per capita income. All results of price elasticity, cross elasticity, and income elasticity of demand for vaname shrimp (*Litopenaeus vannamei*) are elastic.

Keywords: Demand elasticity, shrimp vaname, Bandar Djakarta Ancol.

INTRODUCTION

Jakarta is one of the provinces in Indonesia with a quite high producer of fisheries. The number of processed fisheries production in Jakarta is continually increased , this is a distinct advantage for the Jakarta Province which contributes to national fisheries production. The largest capture fisheries production in DKI Jakarta province is 143,640 (tons / year) (BPS DKI Jakarta, 2016).

North Jakarta is one of the crowded tourist attractions visited by local tourists, one of which is Ancol. This place is very strategic for the Djakarta port seafood restaurant which has a fish market concept with a guaranteed seafood quality variant, because all seafood is provided live and fresh. Seafood is a collection of marine organisms that are used as food. Seafood as a product is a good source of biological nutrition and is widely consumed by the community. Bandar Djakarta Restaurant provides various types of seafood, one of which is vaname shrimp.

According to James (2013) shrimp is one of the organisms from the crustacean group which is rich in active compounds that are important for human health. Shrimp contain active compounds such as omega-3s, minerals, fats, cytins, carotenoids (astaxanthin) and vitamins. There are several chemical elements in shrimp including 12% protein, 0.2% fat, 78% water content, 0.4% ash content calcium 136 mg/100 gr shrimp, 170 mg/100 gr phosphorus shrimp, vitamin B1 0.01 mg/100 gr shrimp, and vitamin A 60 S1/100 gr shrimp (Arpah, 1993).

Shrimp is the result of cultivation that is sought after by the community because it has a delicious taste and high nutrition. In addition, shrimp culinary becomes the people's choice so that the demand for shrimp needs in Indonesia

itself continues to increase. Of course, the better the quality of shrimp, the more expensive the selling price. Basically the demand for an item follows the law of demand which states that if the price of an item rises, the amount demanded will decrease whereas if the price of an item falls then the demand will rise with a note if other things are fixed.

If a small price change causes a large change in the quantity of goods demanded, it is said that the demand for the goods is very responsive to price changes, or the demand is elastic. Conversely, if price changes are relatively large but the demand is not elastic. To find out the extent of the responsiveness of demand to price changes, quantitative measurements need to be carried out to show the extent of the effect of price changes on demand changes called elasticity of demand.

The elasticity of demand for vaname shrimp processed products is very important to study, by knowing the extent of the effect of changes in vaname shrimp prices to changes in demand for processed shrimp products, the Bandar Djakarta Ancol restaurant can provide satisfaction to consumers who purchase vaname shrimp with the expectations and needs of consumers.

RESEARCH METHOD

The study was conducted during August - September 2019 in Bandar Djakarta Ancol. The basic method used in this research is quantitative descriptive with type of case study research. The sampling technique used in this study was accidental sampling.

The types and sources of data used are primary data obtained directly from buyers of processed vaname shrimp products at the Bandar Djakarta Ancol through questionnaires.

DATA ANALYSIS

Demand Elasticity of *Litopenaeus vannamei*

The regression coefficient testing is tested with three kinds of demand models, which are as follows:

1. Price Elasticity

The amount of price elasticity can be determined using the following formula:

$$Eh = \frac{\%\Delta Qx}{\%\Delta Px} \rightarrow Eh = -\frac{\Delta Qx}{\Delta Px}\frac{P}{Qx}$$

Information :

Eh : Price elasticity of demand
Px : Price of goods X
ΔQx : Change in the number of X requested
ΔPx : Change in the number of goods X price

2. Income Elasticty

The amount of Income elasticity can be determined using the following formula :

:

$$Ep = \frac{\%\Delta Qx}{\%\Delta I} \rightarrow Ep = \frac{\Delta Qx}{\Delta I}\frac{I}{Qx}$$

Information:

Ep : Income Elasticty
I : Consumer's Income
Qx : Number of items X requested
ΔQx :Change in the number of requests for goods X
ΔI : Change in the consumer income

3. Cross Elasticity

The amount of cross elasticity can be determined using the following formula:

:

$$Es = \frac{\%\Delta Qx}{\%\Delta Py} \rightarrow Es = \frac{\Delta Qx}{\Delta Py}\frac{Py}{Qx}$$

Information :

Es : Cross Elasticity
Py : Price goods Y
Qx : The number of goods X
ΔQx : Change in the number of requests for goods X
Δpy : Change in the goods X price

Classic Assumption Test

The classic assumption tests used in this study include the following:

1. Multicollinearity Test

Multicollinearity is the perfect or certain linear relationship (correlation) between some or all variables that explain the regression model. A good regression model is seen from the value of tolerance and VIF (Variance Inlaction Factor) (Supriana 2013).

2. Normality Test

Normality test aims to determine whether the data used is normally distributed. Normality test can be done by the Kolmogorov Smirnov test, by looking at the significance value (Firdaus 2011). If the sig value > 0.05 then the data is normally distributed

3. Heteroscedasticity Test

Heterokedastisitas test aims to see whether the regression model occur the variance inequality of the residuals of one other observation in the regression model. If the variance from one observation residual to other observation is fixed, then it is called homokedastisitas or heterokedastisitas is not happening. A good regression model is a good one which is not happening heterokedastisitas (Supriana 2013).

4. Autokoleration Test

Autocorrelation is the correlation between the variables themselves, at different observations of time. Generally, many cases of autocorrelation occur in time series data. One step that can be done to detect autocorrelation is to look at the pattern of relationships between residuals and independent variables. The method used is the Durbin-Watson test (dw test) (Suprniana 2013).

Multiple Linear Regression Model (Vaname Shrimp Demand)

The multiple linear regression model according to Hasan (2008) can be shown as follows:

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e$$

Information :

y :Demand for Vaname Shrimp (Kg/year)
α : Constant
β : Coefficient
X_1 : Price of Vaname Shrimp (IDR)
X_2 : Price of Lobster (IDR)
X_3 : Price of Crab (IDR)
X_4 : Price of Squid (IDR)
X_5 : Income per capita (IDR/year)
X_6 : Age (year)
e : error

F test

The F test was used to determine the effect of all the independent variables together on the dependent variable (demand for shrimp vaname) with a 95% confidence level. The calculated F formula is as follows:

$$\text{F Couting} = \frac{R^2/(k-1)}{(1-R^2)/(N-k)}$$

Information:
R^2 : Determination Coefficient
N : Number of Observations
K : Number of Variable

T test

T test is used to determine the effect of one independent variable individually on the dependent variable, namely the number of vaname shrimp requests at a certain significant level (α), α = 5%. $T_{arithmetic}$ formula is as follows (Matridakis 2011):

$$t_{counting} = \frac{\beta i}{Se(\beta i)}$$

Information:
$T_{counting}$: Statistic T Value
β_i : The Regression Coefficient of the I Independent Variable
Se (β_i) : The Standard Error Independent Variable Regression Coefficient

Result and Discussion

Demand Elasticity

The results of elasticity analysis of vaname shrimp demand in Bandar Djakarta Ancol can be seen in table 1.

Table 1. Demand Elasticity Value for Vaname Shrimp Products in Bandar Djakarta Ancol.

	Elasticity Value		
Variabel	**Price**	**Cross**	**Income**
Price of Vaname	2,5		
Price of Lobster		7,8	
Price of Crab		2,5	
Price of Squid		7,2	
Income Per Capita			7,8

Based on the following table 1 data below, it can be explained that the elasticity of demand is based on price elasticity, cross elasticity and income elasticity:

1. Price Elasticity

Based on the table above it can be seen that the coefficient of elasticity value of vaname shrimp prices is 2.5 which is elastic Eh> 1. The positive value of elasticity indicates that the variable price of vaname shrimp has a relationship that is directly proportional to the demand for vaname shrimp. This means that if the price of vaname shrimp goes up by 1%, the percentage of demand for processed vaname shrimp products will decrease by 2.5% and vice versa if the price of vaname shrimp goes down by 1%, the percentage of demand for vaname shrimp processed products goes up by 2.5%. A price elasticity value of more than one indicates that demand for vaname shrimp is elastic, which means that the percentage change in the quantity demanded is greater than the price change.

2. Cross Elasticity

The cross elasticity value of the price of lobster is 7.8. This means that if the price of lobster rises 1%, the demand for processed shrimp products will increase by 7.8%, and vice versa. A positive sign on the value of elasticity shows that the price of lobster is a substitute for vaname shrimp. While the results of cross elasticity analysis of crab processed products is 2.5. This means that if the price of crabs rises 2.5%, the demand for processed shrimp products rises 2.5% and vice versa. A positive sign on the elasticity value indicates that the processed crab product is a substitution of vaname shrimp.

The result of cross elasticity analysis of squid processed products is 7.2. This means that if the price of squid rises 7.2%, the demand for processed shrimp products rises 7.2% and vice versa. A positive sign on the elasticity value indicates that the squid processed product is not a complementary item.

3. Revenue Elasticity

Based on the analysis, it is known that the magnitude of income elasticity is 7.8 which means that if there is an increase in income by 1% it will result in an increase in the demand for vaname shrimp by 7.8% and vice versa. The coefficient value Ep > 1 or elastic, means that people tend to spend a portion of income more on an item (Salvatore 2006). Positive income elasticity figures that vaname shrimp is a normal item, meaning that if the population income rises, demand for vaname shrimp will increase. A coefficient value of more than one means that the change in the number of requests has a greater proportion than the proportion of the increase in income.

1. Classical Assumption Test

The classic assumption test is performed before multiple linear regression testing is performed. This test is intended to find out whether the model proposed in this study is declared free or passes the classic assumption test.

a. Multicollinearity

Based on the coefficients shown in table 2, it can be seen that the tolerance value is greater than 0.1, which means there is no multicollinearity between the independent variables and the Variance Inflation Factor (VIF) on each independent variable no greater than 10 then there are no symptoms multicollinearity. Conversely, if the VIF value is relatively large (more than 10) it means that the regression equation experiences multicollinearity (Yamin and Heri, 2009).

Table 2. Coefficients test results

Model	Collinearity Statistics	
	Tolerance	VIF
Price of Vaname	0,223	4,479
Price of Lobster	0,229	4,366
Price of Crab	0,161	6,215
Price of Squid	0,632	1,582
Income Per Capita	0,747	1,338
Age	0,743	1,346

b. Normality

Based on table 3 the value of Kolmogorov–Smirnov Z is 0.125, then the data is normally distributed. If the significance value is above 0.05 then the data is normally distributed. While if the significance value is below 0.05, the data is not normally distributed (Ghozali 2016).

Table 3. Kolmogorov-Smirnov Test One-Sample

		Unstandardized Residual
N		53
Normal Parameters [a .b]	Mean	,0000000
	Std. Deviation	49,85527361
Most Extreme Differences	Absolute	,125
	Positive	,076
	Negative	-,125
Kolmogorov-Smirnov Z		,125
Asymp.Sig.(2-tailed)		,038[c]

c. Heteroscedasticity Test

Heteroscedasticity test is used to test the occurrence of variance inequality from one observation to another in the regression model. Based on the results of the analysis table using the Glejer test, the significance value of all variables is more than 0.05, so there is no heteroscedasticity (Ghozali 2013).

Table 4. Glejer Test Results

Model	Sig.
Price of Vaname	0,973
Price of Lobster	0,426
Price of Crab	0,693
Price of Squid	0,475
Income Per Capita	0,805
Age	0,431

d. Autocorrelation Test

SPSS output results show a DW value of 1.752, this value will be compared with the table value by using a 5% degree of confidence, the number of samples (n) is 52 and the number of independent variables (k) = 6, then in the Durbin Watson table the dL value is obtained watson lower/lower limit) = 1.3090, the value of Du (durbin watson upper/upper limit) = 1.8183, 4-dU = 2.1817, and 4 - dL = 2.691. Decision making is **dL (1.3090) ≤ d (1,752) ≤ Du** it means that you cannot make any decisions.

Table 5. Autocorrelation Test Results

Model	R	R Square	Durbin- Watson
1	,921a	,849	1,752

2. Multiple Linear Regression Models

The multiple linear regression equations that is collected based on the results of the data analysis in Table 6 aras follows

Table 6. *Coefficients Variable*

Model		Unstandardized Coefficients		T	Sig.
		B	Std. Error		
1	(Constant)	-6730,776	782,187	-8,605	,000
	Price of Vaname	145,046	115,666	1,254	,216
	Price of Lobster	402,646	172,831	2,330	,024
	Price of Crab	-144,279	152,268	-,948	,348
	Price of Squid	436,369	68,465	6,374	,000
	Income Per Capita	322,625	115,528	2,793	,008
	Age	355,567	76,685	4,637	,000

Based on the calculation results in table 6 above, we got the following linear regression equation:

$$\gamma = -6730{,}776 + 145{,}046\ X_1 + 402{,}646\ X_2 - 144{,}279\ X_3 + 436{,}369\ X_4 + 322{,}625 X_5 + 355{,}567 X_6 .$$

From the regression equation above, a constant value of 6730,776 is obtained. This figure means that the demand for vaname prawns will be worth if 6730,776 other factors equal zero. In other words, the quality of demand for vaname shrimp will be at the level of 6730,776 if there are no other seafood consumption activities.

The sign of independent variable regression coefficient indicates the direction of the related variable with the demand for processed vaname shrimp products. Regression coefficient for variable X_1, namely the price of vaname shrimp is positive, shows the direct relationship between the price of vaname shrimp with demand for processed shrimp products. Variable regression coefficient 145,046 X_1, 402,646 X_2, 436,369 X_4, 322,625 X_5, 355,567

X_6, a positive value which indicates a direct relationship between the price of vaname shrimp, lobster prices, squid prices, per capita income, and age of demand for processed vaname shrimp products. Regression coefficients on each variable of X_1, X_2, X_4, X_5, and X_6 which means that each increase in vaname shrimp prices, lobster prices, squid prices, per capita income and age by one unit will cause increased demand for processed shrimp products vaname of 145,046 X_1, 402,646 X_2, 436,369 X_4, 322,625 X_5 and 355,567 X_6 units.

The regression coefficient for negative variable X_3, indicating that there is an unidirectional relationship between the price of crabs and the demand for processed vaname shrimp products. Variable regression coefficient X_3 is -144.279 which means that each increase in the price of crab by one unit will cause a decrease in demand for processed vaname shrimp products by 144.279 units.

3. T Test

Based on the table it can be seen that the variable price of lobster, squid price, income per capita, and age significantly influence the demand for processed vaname shrimp products at Bandar Djakarta Ancol at a 95% confidence level. This is indicated by the significant value variable from lobster prices, squid prices, per capita income, and the age that are smaller than $\alpha = 0.05$ so that the variable lobster prices, crab prices, squid prices, per capita income, and the age is significantly affected. Variables and the price of crabs and the demand for vaname shrimp prices on processed vaname shrimp products in Bandar Djakarta Ancol had no significant effect. This is indicated by the significance value of the variable which is greater than the value of $\alpha = 0.05$.

Table 7. T-Test Analysis Results

Variabel	Koefisien regresi	t-hitung	Signifikansi
Price of Vaname	145,046	1,254	,216[ns]
Price of Lobster	402,646	2,330	,024*
Price of Crab	-144,279	-,948	,348[ns]
Price of Squid	436,369	6,374	,000*
Income Per Capita	322,625	2,793	,008*
Age	355,567	4,637	,000*

4. F Test

Based on the table, it can be seen that the significance value is 0.000, this value is smaller than $\alpha = 0.001$, which means that the independent variable is the price of vaname shrimp, lobster price, crab price, squid price, income per capita, and age all have a very influential effect. Evident at the 95% confidence level for the demand of processed vaname shrimp products. It is known that the F table value is 2.30 and the calculated F value is 43.033 which means that the calculated F value is greater than the F table ($F_{value} > F_{table}$) which means that the independent variable (variable price of vaname shrimp prices, lobster prices, crab prices, squid prices - squid, income per capita, age) together influence the change in the value of bound variable (demand for processed vaname shrimp products).

Table 8. Results of Analysis of Variance

	Model	Df	Mean Square	F	Signifikansi
1	Regresi	6	120911,412	43,033	,000[b]
	Residual	46	2809,750		
	Total	52			

CONCLUSION

Research on elasticity of demand for processed vaname shrimps in Bandar Djakarta Ancol yields has several conclusions:

1. The value of the price elasticity of vaname shrimp is 2.5 which means the price is elastic. Whereas the variable cross elasticity used is the price of lobster with an elasticity value of 7.8, the price of crab with an elasticity value of 2.5, and the price of squid with an elasticity value of 7.5 which means elastic. These three variables are substitutes for processed vaname shrimp products. The income elasticity value is 7.8 which is elastic.
2. Factors affecting the demand for processed vaname shrimp products at Bandar Djakarta Ancol are vaname shrimp prices, lobster prices, crab prices, squid prices, income and age

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