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ELASTICITY OF DEMAND MACKEREL (*Rastrelliger kanagurta*) IN FISH AUCTION MARKET BANDAR LAMPUNG CITY

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ABSTRACT

This study aims to determine how much the elasticity of demand and analyze the factors that affect the elasticity of demand for mackerel (*Rastrelliger kanagurta*) in the Bandar Lampung City at fish auction market. This research was conducted in July 2019 to September 2019. The method used was a quantitative descriptive method using primary data and secondary data. The sampling technique used in this study was accidental sampling. Accidental sampling technique is by sampling respondents based on coincidence, ie anyone who accidentally meets with a researcher and can be used as a sample if people who happen to be met are suitable as data sources. The results showed that the demand for mackerel (*Rastrelliger kanagurta*) in the Bandar Lampung Auction Market in Bandar Lampung was elastic and showed that the factors influencing the demand for mackerel (Rastrelliger kanagurta) were the price of mackerel, tuna fish prices, anchovies fish prices, rice prices, income.

Keywords : Demand elasticity, Mackerel, Fish auction market

INTRODUCTION

Lampung is one of the provinces that have the potential of marine fishery resources is large enough, and a long coastline. Bandar Lampung is an area which has the third largest fishery potential with total production of 22269.50 tonnes / year after the South Lampung regency (38465.40 ton / year) and East Lampung (40951.30 ton / year) (BPS Lampung 2015) ,

The level of Bandar Lampung consumption rate reached 21.87 kg per capita per year, with a target of national fish consumption per capita is 47.17 kilograms per capita per year. Score big enough for an area of only 169.2 km2 area (Department of Marine and Fisheries Bandar Lampung 2018).

The highest number of marine fish production in the city of Bandar Lampung found in puffer fish species where total production was 1255.05 kg per year, and tuna with fish production sbesar 1218.49 kg per year, mahi-mahi of 854, 64 kg per year and trevally fish amounted to 731.82 kg per year (Department of Marine and Fisheries, Bandar Lampung in 2012).

Elasticity of demand is the effect of price changes to changes in demand. Total demand for fresh fish is strongly influenced by the prevailing price, which if the fish is cheap while fixed supply then the demand increases, and vice versa. The issue is what factors must be considered to build the model with market conditions and the availability of data (Ilham et al 2010).

Demand is influenced by several factors that influence the demand for goods other than the price of the goods themselves. These factors include the price of goods is concerned, prices of substitute or complement, tastes, population, and income level (Daniel 2004).

Based on the existing problems, the study aims to: Analyze how big the elasticity of demand for mackerel in Warehouse Market Auction and analyze the factors that affect the elasticity of demand for mackerel in Warehouse Market Auction

RESEARCH METHODS

Place of research at Auction Warehouse Market Jl. Ikan Bawal 1, Teluk Betung Selatan, Bandar Lampung. The basic method used in this research is quantitative descriptive. The sampling technique used in this study was accidental sampling

In this study the authors used two data sources are primary data and secondary data. As for the source of primary data in this study is the merchant marine fish and sea fish buyers. Secondary data sources, used as a support of the first source

DATA ANALYSIS

Elasticity Demand of Mackerel

Size that can be used to determine the relationship between demand and the factors influencing it is the elasticity of demand. According to Burhan (2006) elasticity of demand can be divided into three kinds, namely:

1. The price elasticity

The relationship between price and quantity is reversed then the coefficient of price elasticity of demand is negative, which can be formulated as follows:

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

Information :
Eh: Price elasticity of demand
Px: Prices of goods X
ΔQx: Changes in the amount of X demanded
ΔPx: Changes in prices of goods X

2. Income elasticity

Large income elasticity can be determined using the following formula:

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

The end result Description:
Ep : The income elasticity
I : Consumer Income
Qx : The number of items requested X
ΔQx : Changes in the amount of demand for goods X
ΔI : Changes in consumer income

3. Cross elasticity

The amount of cross elasticity (Es) can be calculated as follows:

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

Information :
Es: cross elasticity
Py: Prices of goods Y
Qx: Number of items X
ΔQx: Changes in the quantity of X demanded
ΔPy: Changes in prices of goods Y

Classic assumption test

There are four classic assumption test used in this study include normality test, heterocedasticity, multicollinearity, and autocorrelation (Supriana 2013).

1. Multikolinaeritas test

Multikolinearitas is linear relationship (correlation) is perfect or certainly among some or all of the variables that explain the regression model. The data used is the use of factor dilogaritmakan. A good regression model should not happen .There was correlation between the dependent variable or not multicollinearity in regression models looks of tolerance and VIF (Variance Inlaction Factor) (Supriana 2013).

2. Normality test

Normality test aims to determine whether the data used has terdistribsi normally. Normality test can be done with the Kolmogorov-Smirnov test, to see the value of significance (Paradise 2011). If Sig. Ks> 0.05 = normally distributed data

3. Heteroscedasticity test

Heteroscedasticity test aims to see whether the regression model occurred inequality residual variance from one another observation in the regression model. If the variance of the residuals of the observations to other observations remain, then called homokedastisitas or not happen heterokedastisitas. A good regression model is good is not happening heterokedastisitas (Supriana 2013).

4. Autocorrelation test

Autocorrelation is the correlation between the variable itself, at different observation times. Generally more common in cases of autocorrelation time series data. One step that can be done to detect autocorrelation

is to see the pattern of the relationship between the residual and the independent variables. The method used is the Durbin-Watson test (Test dw) (Suprniana 2013).

Multiple Linear regression models

Multiple regression equation for two predictor set are as follows:

$$\gamma = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + e$$

Information:
γ = Demand mackerel (kg)
α = Coefficient constant
β = Regression coefficient
x_1 = Price of mackerel (IDR / Kg)
x_2 = Price of tuna (IDR / Kg)
x_3 = Price of anchovies (IDR / Kg)
x_4 = Price of Rice (IDR / Kg)
x_5 = Income per capita (IDR / year)
e = The error rate (errors) / Effect of other factors

F test

F test is a test of the regression coefficients simultaneously. The test is performed to determine the effect of all independent variables included in the model together (simultaneously) on the dependent variable. According Sugiyono (2014) formulated as follows:

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

Information:
R2 = coefficient of determination
k = number of independent variables
N = number of observations

T test

T test (t-test) testing of the partial regression coefficients, testing was conducted to determine the significance of the partial role of the independent variable on the dependent variable to assume that the other independent variables held constant. According Sugiyono (2014), using the formula:

$$t\ hitung = \frac{\beta i}{Se(\beta i)}$$

Information:
t = T statistic
= Independent variable regression coefficient i-thβi
$Se(\beta i)$ = Standard error of the regression coefficients of independent variables to-i

RESULTS and DISCUSSION

The results of the analysis of demand elasticity mackerel in the warehouse market auction port city of Lampung in Table 1 below:

table 1, elasticity of demand for mackerel in the warehouse market auction

variables	Price	Silang	Income
the price of mackerel	8.50		
the price of tuna		0.56	
the price of achovies		- (0.82)	
The price of rice		- (0.79)	
Income			0.99

a. Price elasticity

Based on the results of analysis the magnitude of an elasticity of 8.50. The elasticity is positive indicates that the variable price of mackerel has a proportional relationship with the request mackerel. This means that if the price of mackerel rose 1%, the demand for mackerel will be down by 8.5%, and vice versa if the price of mackerel fell by 1%, the demand for mackerel will rise by 8.5%. The only positive sign explains the proportional relationship between the price of goods by the number of requests (Sadano Sukirno, 2014).

b. Cross elasticity

Cross elasticity value of the price of tuna is 0.56. This means that if the price of tuna rose 1%, then the demand for mackerel will rise by 0.56%, and vice versa. A positive sign on the elasticity indicates that swordfish are substitutes of mackerel. This is because tuna classified as marine fish are much in demand.

Cross elasticity coefficient mackerel against achovies fish is 0.82. That is, if the trevally fish increased in price by 1% then trevally fish demand will rise by 0.82%, and vice versa.

c. Income elasticity

Based on the results of analysis the magnitude of the income elasticity is 0.99, which means that in case of a revenue increase of 1% will result in increased demand by 0.99% mackerel, and vice versa. Figures marked positive income elasticity indicates that the mackerel are normal goods, meaning that if

the incomes of the population rises, the demand for mackerel will increase.

Classic assumption test

a. Normality test

Normality test aims to test whether continuous data

normal distribution or not. To test whether the data is normal or not, the researcher using the Kolmogorov-Smirnov analysis as follows:

Table 2. Kolmogorov-Smirnov Test One-Sample

		Residual unstandardized
N		50
Normal Parametersa, b	mean	, 0000000
	Std. deviation	, 43741120
Most Extreme Differences	Absolute	, 114
	positive	, 114
	negative	-, 077
Test Statistic		, 114
Asymp. Sig. (2-tailed)		, 111C

From table 2 One Sample Kolmogrof-Smirnov Test figures obtained probability or asymp. Sig. (2-tailed). This value is compared with the 0.05 (in this case using a significance level of 5% or α = 5%). So from this empirically known that all the p-value for the data turned out to be greater than = 5% (p> 0.05), so it can be stated that the overall data obtained has a normal distribution.

b. Multicoloniarity test

Multicoloniarity test aims to test whether there is a correlation in the regression model between independent variables. The test results multicoloniarity using a correlation matrix as follows:

Table 3. Coefficients test result

Model	**collinearity Statistics**	
	Tolerance	**VIF**
(Constant)		
the price of mackerel	.818	1.222
the price of tuna	.938	1,066
the price of achovies	0.715	1.398
the price of rice	0.65	1,538
Income	0.627	1,594

Multicoloniarity Test calculation results can be viewed in two ways, namely by looking at the value of tolerance and Variance Inflation Factor (VIF). Cutoff value that is commonly used to indicate the presence multicoloniarity is Tolerance value ≤ 0.10 or equal to the VIF value ≥ 10. Coefficients Based on these figures the conclusion that the independent variable multikoloniaritas free from classical assumptions.

c. Heteroscedasticity test

Heteroscedasticity test aims to test whether the regression model occurred inequality variance of residuals of the observations to other observations. If the probability of significant above the 0.05 confidence level it can be concluded that the regression model does not contain any heteroscedasticity.

Table 4, Glejer Test Result

Model	**Sig.**	**P ***
(Constant)	.834	> 0.05
the price of mackerel	0.46	> 0.05
the price of tuna	.536	> 0.05
the price of achovies	0,641	> 0.05
the price of rice	0.511	> 0.05
Income	0.611	> 0.05

Pada Table 4 are shown the results of the calculation of heteroscedasticity test which showed no interference heteroskedastisitas, since the value of p> 0.05 or insignificant in = 5%. Overall, therefore, it can be concluded that there is no problem of heteroscedasticity in this study

d. Autocorrelation test

Autocorrelation is the correlation that occurs between members of a series of observations that lie in rows in series in the form of time (if the data time series) or the

correlation between the adjacent (if the cross-sectional data) (Ghozali, 2011). Presence or absence of autocorrelation testing done by using the Durbin-Watson.

Table 5. Autocorrelation Test Result

Model	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	, 930	, 46160	2,215

Thus the value of Durbin Watson amounted to 2.215 greater than the upper limit of du (dU) 1.7708 and less than (4-dU) 4 to 1.7780. So as the basis for a decision in a test watsondi durbin above, it can be concluded that there are no problems or symptoms of autocorrelation.

Multiple linear regression

Multiple linear regression analysis is used to see the effect of the price of mackerel, the price of tuna, trevally fish prices, the price of rice and revenue to Demand mackerel.

Table 6. coefficients variable

Model	Coefficients unstandardized	
	B	Std. Error
(Constant)	-29.098	3,334
the price of mackerel	6.556	0.292
the price of tuna	.419	0,265
the price of achovies	-0.646	.329
the price of rice	-0.544	0,349
Income	.607	0,244

Based on calculations in the table above, obtained form the multiple linear regression equation as follows:

Y = -29.098 + 6.556 X1 + 0419 X2 - X3 0,646 - 0,544 X4 + X5 0607

Independent variable regression coefficient signs indicate the direction of the relationship of the variables concerned with requests processed fish products. The regression coefficient for the independent variable X1 is positive, indicating a direct relationship between the price of mackerel with a request mackerel. X1 variable regression coefficient of 6.556 implies for each increment Price mackerel by one unit will lead to reduced demand for mackerel amounted to 6.556 units.

Correlation test

Correlation test used to determine the degree of relationship and contribution of independent variables on the dependent variable. The results of the analysis of correlation r = 0.968 means that values close to 1, the correlation between all independent variables (price mackerel, the price of tuna, trevally fish prices, the price of rice and revenue) is said to be positive and very strong. The relationship between all independent variables (price mackerel, the price of tuna, trevally fish prices, the price of rice and revenue) is directly proportional to the dependent variable (Demand mackerel).

test F

F test is used to determine whether the independent variables studied together significantly affect variation in demand mackerel Auction Warehouse Market in Bandar Lampung. The results of F test analysis in Table 7 below.

Table 7. Result of Analysis of Variance

Model	Df	mean Square	F	Sig.
Regression	5	28.061	131.698	,000b
residual	44	.213		
Total	**49**			

Based on Table 7 it can be seen that the significant value of 0.000 and smaller than α = 0.05. And also F count equal to 131.698 unknown is greater than F table 2.42. Means that the variable price of mackerel, the price of tuna, trevally fish prices, the price of rice and revenue together significantly affect demand for mackerel in Auction Warehouse Market in Bandar Lampung.

T test

The t-test is a test conducted to determine the effect of independent variables studied individually to requests mackerel at Auction Warehouse Market in Bandar Lampung. The results of t test analysis in Table 8 below:

Table 8. T-Test Analysis Result

Model	T	Sig.
the price of mackerel	22.45	, 000 *
the price of tuna	1.578	, 122 ns
the price of achovies	-1.965	, 056 ns
Price of Rice	-1.558	, 126ns
Income	2.484	, 017 *

Information:
*: Significant to the extent of 95%
ns: not significant

Based on Table 8 it can be seen that the variable price of mackerel, and earnings significantly affect demand for mackerel in Auction Warehouse Market in Bandar Lampung arrive at the 95% confidence level. This is demonstrated by the significant value of the variable price of mackerel, and the income is smaller than the value of $\alpha = 0.05$, when using a t-table values obtained 2.0154, t-test mackerel prices, and incomes have a greater value than 2 , 0154 so the price variable mackerel, and revenue significant. Variable prices tuna, anchovies fish prices and the price of rice on demand mackerel at Auction Warehouse Market in Bandar Lampung no significant effect. This is demonstrated by the significant value of these three variables is greater than the value of $\alpha = 0.05$.

CONCLUSION

Based on the research that has been conducted on the price elasticity values obtained mackerel amounted to 8.50 which means the price is elastic. While on the cross elasticity variable used is the price of tuna with the elasticity of 0.56, the price of trevally fish with the elasticity of 0.82, and the price of rice with a value of 0.79, which means inelastic. Those variables are substitutes of tuna. The value of that income elasticity of 0.99 which is inelastic.

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