Analysis of the Exchange Rate of Bubu Fishermen in Ketapang Village, Tangerang Regency, Indonesia

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Original Research Article

ABSTRACT

The study aimed to analyze exchange analyze the exchange rate of fishermen and analyze the factors that influence the exchange rate of fishing traps in Ketapang Village. This research was conducted from March 2022 to June 2022. Data collection was carried out from April 20, 2022 to May 15, 2022 in Ketapang Village, Tangerang Regency, Indonesia. The method in this study uses a survey method with interview techniques. The resources used are primary data and secondary data. Primary data includes fisherman profiles, fishing experience, characteristics of fishing gear and vessels, commodities and number of catches, as well as income and expenses in the fishery and non-fishery sectors of trap fishermen in Ketapang Village, Tangerang Regency. Secondary data were obtained from the District in Ketapang Village. Data was collected using purposive

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sampling technique with a total population of 15 samples. Data analysis in this study used quantitative descriptive analysis. Based on the results of the study, it can be seen that the average fisherman exchange rate (NTN) in Ketapang Village, Tangerang Regency is 0.76 or less than 1, meaning that Bubu Fishermen in Ketapang Village, Tangerang Regency have not been able to meet their household needs or in the sense of On the other hand, the amount of revenue is still lower than the amount of expenditure. The factors that influence the exchange rate of fishermen in Ketapang Village, Tangerang Regency are fishery product receipts and household expenditures.

1. INTRODUCTION

Indonesia is an archipelagic country with an area of 7.81 million km^2 and consists of 17,499 islands and is surrounded by 95,181 km coastline. A total area, 3.25 million km^2 is an ocean with an Exclusive Economic Zone (EEZ) of 2.55 million km^2. Therefore, Indonesia is known as the largest maritime and archipelagic country in the world [1].

The coast is a unique area, because in the context of the landscape, the coastal area is where land and sea meet. The statement supports the potential of marine and fishery resources that can be relied on for the survival of the Indonesian people, the potential of marine and fishery resources is one of the most widely used and *renewable natural resources*. So if used properly capture fisheries can be one solution to improve the welfare of the country in the future [2].

Fishermen in coastal areas are very dependent on the potential of fishery natural resources. As a coastal area that has a fairly good geographical location, Ketapang Village has potential that can be developed for its capture fisheries products. This research is focused on Ketapang Village. Ketapang Village is a village located in Mauk District, Tangerang Regency, Banten Province. Ketapang village has an area of 4,169 km2 with a population of 5,968 people and a density of 1.44 people/km2. The position of this Ketapang village is directly opposite the Java Sea, which causes 86% of the people of Ketapang Village to work as fishermen. The majority of fishermen in Ketapang Village use trap fishing gear with the main catch commodity is crab.

The income from fishery products, especially fishing fishermen, is very different from the income from traders and agriculture. This is because a trader is able to predict the possible profits that will be obtained, and a farmer is able to predict his harvest, while a fisherman cannot predict his catch because the activities carried out by fishermen are full of uncertainty, are speculative and fluctuating and depend a lot on natural products [3]. Therefore, it can be said that the life of fishing communities is a real situation and can be expressed through the results of fishing efforts that are influenced by seasons, natural conditions, limited capital, and low levels of education which result in weak socio-economic conditions [4].

Although it has enormous potential, until now there has been no research that measures the welfare level of capture fishermen in Ketapang Village. Therefore, research on the analysis of the exchange rate of bubu fishermen in Ketapang Village, Tangerang Regency is very necessary in order to find out the fisherman's exchange rate and the factors that affect the exchange rate of bubu fishermen in Ketapang Village.

2. METHODOLOGY

This research was conducted from March 2022 to June 2022. Data were collected from April 20, 2022 to May 15, 2022. The study was conducted in Ketapang Village, Tangerang Regency. Ketapang Village was chosen as the location of this research because Ketapang Village is one of the fishing villages in Tangerang Regency.

The method in this study uses a survey method with interview techniques. The survey method is a method used to obtain data from a place that is natural (not artificial) and researchers carry out treatments in data collection, such as distributing questionnaires, conducting tests, conducting interviews with sources, and so on without conducting experiments [5]. Basically, the survey method is a scientific method used to obtain data with a specific purpose [6].

The data collected in this study are primary data and secondary data. Primary data is data

obtained directly through interviews. The data includes fisherman profiles, fishing experience, characteristics of fishing gear and vessels, commodities and number of catches, as well as income and expenditures in the fishery and non-fishery sectors of trap fishermen in Ketapang Village, Tangerang Regency. Secondary data is data obtained from the District in Ketapang Village.

This research uses *purposive sampling technique. Purposive Sampling* is a sampling method based on certain considerations such as population characteristics or previously known characteristics [7]. In practice, the researchers took a sample of fishermen respondents in Ketapang Village in accordance with existing conditions. The requirements for the respondents in this study are to use Bubu fishing gear, be at least 25 years old, have at least 1 year of work experience, and are married.

In statistical data analysis, the number of samples needed for research is 30 to 500 samples [7]. In this study, it is known that the population of bubu fishermen in Ketapang Village is 73 people.methods *descriptive* requires a minimum of 10% of a sample from a population, with a note in a small population that a minimum sample of 20% is required [8]. If it is known that the population of trap fishermen in Ketapang Village is 73 people, then 20% of the total population is 15 samples. That way, the number of samples to be taken can already meet the minimum sample requirements.

Data analysis in this study used quantitative descriptive analysis. Descriptive research is a research method that aims to describe the phenomena that exist and take place at this time or in the past [9]. Meanwhile, quantitative method is a method used to raise facts, determine the influence of variables, and phenomena that occur at this time by presenting research results as they are [10]. In this study, quantitative methods are used to analyze the level of welfare and the factors that influence the welfare of fishermen in Ketapang Village, Tangerang Regency, which consists of:

2.1 Fisherman's Exchange Rate

Analysis Formulation of Fisherman's Exchange Rate Analysis as a tool in measuring welfare levels [11], , are as follows:

$$NTN : \frac{\sum P_{xi} Q_{xi}}{\sum P_{yi} Q_{yi} + \sum P_{yj} Q_{yj}}$$

Explanation:

NTN : Fishermen's Exchange Rates
P_{xi} : Prices of Fishery Commodities
Q_{xi} : Quantity of Fishery Commodities
P_{yi} : Prices of Production Inputs
Q_{yi} : Quantity of Production Inputs
P_{yj} : Prices Household Expenditure
Q_{yj} : Quantity of Household Expenditure

Based on the calculation of the Fisherman's Exchange Rate, the following conclusions can be drawn:

NTN > 1 means that fishermen are prosperous,
NTN = 1 means fishermen are quite prosperous, and
NTN < 1 means fishermen are less prosperous

2.2 Multiple Linear Regression Analysis

In this study, the method of multiple linear regression analysis was used to determine the factors that could t affects the exchange rate of fishermen in Ketapang Village, Tangerang Regency, using the following model:

$$Y: a + B1X1 + B2X2 + B3X3 + B4X4 + e$$

Explanation:

Y : NTN figure.
a : Constant.
X1 : Number of family members (persons).
X2 : Number of Trips (trips/month).
X3 : Income from fishery products.
X4 : Work experience (years).
B1-B4 : Coefficient Value of each variable.
E : *Error*, the estimation of the coefficient of the regression variable uses the *Ordinary Least Square* (OLS) method, so that the value of e (*error*) can be minimized

The concept of elasticity is used to determine the degree of sensitivity of fishermen's poverty to the factors that influence it. The magnitude of the elasticity value in this model can be known directly through the magnitude of the regression coefficient of the estimator variables [12].

2.3 Statistical Performance Test

2.3.1 Normality test

Test The normality test serves to determine whether the independent variable (X) and the dependent variable (Y) in the regression model are normally distributed or not normally distributed. If the data is normally distributed, then data analysis and hypothesis testing will be carried out using parametric statistics. In this study, the statistical tool used to detect whether the data is normally distributed or not is using the Shapiro-Wilk normality test. The Shapiro-Wilk test is generally used for samples that are limited and less than fifty (50) in order to produce an accurate decision. In the Shapiro-Wilk test, the significant probability value used is greater than 0.05. If the significant probability value has a value of more than 0.05, then the data is normally distributed. On the other hand, if the significant probability value is less than 0.05, then the data is not normally distributed [13].

2.3.2 Multicolinearity test

Test The multicollinearity test is a test phase that aims to determine whether or not there is a significant correlation between independent variables (predictors/independent) in multiple linear regression models. A good regression model is a model that has no correlation between the independent variables [14]. To detect the presence or absence of multicollinearity in this regression model, it can be determined using the VIF method or *Variance Inflation Factors.* If the *tolerance* close to 1 with the VIF value around the number 1 and does not exceed the number 10, it can be stated that the regression model in this study does not experience multicollinearity.

2.3.3 Heterodasticity Test

Test The heteroscedasticity test is a test method used to detect the presence or absence of variance inequality from the residuals for all observations contained in the regression model. If there is a deviation in the heteroscedasticity test, then the multiple linear regression model can be said to be inaccurate. The method used to detect the presence of heteroscedasticity is by looking at the presence or absence of a pattern formed on the *scatterplot* between the residual value (SRESID) which is the dependent variable (YY axis prediction - Y nll) with Z-prediction (ZPRED) for the independent variable (axis YY prediction - Y nll) with Z-prediction (ZPRED) for the independent variable (axis XY prediction results) which have been *standardized* [14]. If in the heteroscedasticity test the points on the *scatterplot* between ZPRED and SRESID show that there is a spread of data and does not form a certain pattern, it can be ascertained that the multiple linear regression model includes homoscedasticity.

2.3.4 Partial hypothesis test (T-test)

The T-test is used to test the ability of each independent variable in explaining the dependent variable in the regression model. The t-test was carried out by comparing t-count with t-table with a confidence level of 5% (0.05). If t count is greater than t table then H_0 rejected. However, if t count is smaller than t table then H_1 rejected [5].

2.3.5 Simultaneous hypothesis testing (F-test)

The F test is a test model that aims to determine the effect of all independent variables simultaneously on the dependent variable. Or to find out about the significance of the regression model used. If the model is significant then the regression model can be used as a *predictor*. Meanwhile, if the regression model shows non-significant results, the regression model cannot be used as a *predictor*. The test was carried out using a confidence level of 5% (0.05). If F count is greater than F table then H_0 rejected, but if F count is smaller than F table then H_0 accepted [5].

2.3.6 Coefficient of determination (R^2)

Coefficient of determination (R^2) is a test model used to measure how big the percentage of the ability of the independent variable (independent) can explain the dependent variable (dependent) in the regression model. In the coefficient of determination, the value of R^2 between 0 and 1. If the value of R^2 is zero, then the independent variable in the regression model is unable to explain the variation in the dependent variable. On the other hand, if the value of R^2 is one, this indicates that the independent variable can explain 100% of the variation in the dependent variable.

3. RESULTS AND DISCUSSION

3.1 Profile of Ketapang Village

Ketapang Village is a village located in Mauk District, Tangerang Regency, Banten Province.

Ketapang village has an area of 4,169 km^2 with a population of 5,968 people and a density of 1.44 people/ km^2. The position of this Ketapang village is directly opposite the Java Sea, which causes 86% of the people of Ketapang Village to work as fishermen. The majority of fishermen in Ketapang Village use trap fishing gear with the main catch commodity is crab. Ketapang Village is currently focusing on building its village to become a tourist destination. The tourist destinations offered in the village of Ketapang are mangrove tourism, for now this mangrove tourism destination is still in the development stage and has not been opened to the public.

3.2 Characteristics of Fishermen in Ketapang Village

The data obtained from the characteristics of fishermen in Ketapang Village aims to determine the background and condition of fishermen in Ketapang Village. This data contains the identity of the respondents who are seen in accordance with the problem of study.

Age is considered one of the important things because age can determine a person's productivity. The age group that is considered productive is 15-55 years [15]. Based on the parameter of age (Table 1), shows that the age of fishermen in Ketapang Village, Tangerang Regency, the oldest is 54 years old, the youngest is 28 years old, the average age of fishermen in Ketapang Village is 39.40 years and the majority of fishermen according to interviews are 39 years old. The data shows that all fishermen are in the productive age of 15-55 years, this can be one of the supporting factors where fishermen in Ketapang Village, Tangerang Regency can increase their income.

A higher level of education will ensure continuous improvement in the level of technology used by society. Based on the parameter of education (Table 1), it can be seen that the most recent education of fishermen in Ketapang Village, Tangerang Regency is at the elementary or elementary school level. There are several factors that can explain why fishermen's education in Ketapang Village, Tangerang Regency is on average only limited to elementary school, the fishermen's thinking that being a fisherman is a descendant and education is not an important thing and has an impact on fishing activities, besides the economic factor It also hinders the level of education.

The number of family members or the number of family dependents is a burden whose needs must be met or borne by the individual, in other words, family members who do not have income will be counted in the number of family dependents. Based on the parameter of number of family members (Table 1), the majority of fishermen in Ketapang Village, Tangerang Regency have 2 family members, the most family members are 4 people and the minimum is 1 person. The more family members in the fisherman's household, the greater the family's expenses [16].

One of the factors for fishermen to develop their business or ability in the field of fishing is work experience. Based on the parameter of working experience (Table 1), it can be seen that the majority of fishermen who participated in the interview had experience as fishermen in Ketapang Village, Tangerang Regency, for 24 years, the longest working experience was 35 years and the lowest was 16 years. From these data, it can be seen that fishermen in Ketapang Village, Tangerang Regency have been fishing since elementary school to junior high school so they have quite a long work experience.

Fishery revenue is the income obtained from multiplying the income per trip by the number of trips made in one month, this fishery income does not include the cost of going to sea. Based on the parameter of fishery product revenue (Table 1), it can be seen that the largest fishery revenue is IDR 3,925,000, the smallest fishery revenue is IDR 1,950,000, and the average fishery revenue in Ketapang Village, Tangerang Regency is IDR 2,924,333. The size of fishery revenue is influenced by the number of trips in a month and per-trip income.

Household expenditure can be an indicator of the welfare of a population. Based on the parameter of household expenditure (Table 1), it can be seen that the largest consumption expenditure is at IDR 3,700,000 and the lowest consumption expenditure is IDR 1,050,000 per month.

The income of fishermen in Ketapang Village, Tangerang Regency is influenced by the number of trips each month, rainfall This working time is calculated in trips/month, meaning that the more often fishermen go out to sea to eat, the more income will affect their income. Based on the parameter of number of trips (Table 1), it can be seen that the highest number of trips in one month is 26 trips. , the number of trips at least in

one month there are 20 trips, the number of trips is calculated every month.

In general, fishermen depend on fishing activities for their livelihoods, but fishermen in Ketapang Village, Tangerang Regency, do not only depend on fishing. Based on the parameter of fishermen's income (Table 1), it can be seen that the highest income earned by fishermen in Ketapang Village, Tangerang Regency is IDR 2,850,000, the lowest income is IDR 800,000. Fishermen's income figures can be low due to many things, the most common cause in

Ketapang Village is the selling price to collectors is very low and far from the market price.

3.3 Analysis of Fisherman's Exchange Rate

The Central Statistics Agency uses the fisherman's exchange rate to consider all income and expenses of fishermen's families. The fisherman's exchange rate is used to measure the relative welfare level of the fishing community and is a measure of the fishermen's ability to meet subsistence needs [11].

Table 1. Characteristics of fishermen in Ketapang village

Parameter	Indicator	Value
	Maximal	54 Year
Age	Minimal	28 Year
	Average	39.40 Year
	Median	39 Year
	Modus	39 Year
	Maximal	3 (Senior High School)
	Minimal	1 (Elementary School)
Education	Average	1.46 (Elementary School)
	Median	1 (Elementary School)
	Modus	1 (Elementary School)
	Maximal	4 Person
	Minimal	1 Person
Number of Family Members	Average	2.5 Person
	Median	2.5 Person
	Modus	2 Person
	Maximal	35 Year
	Minimal	16 Year
Experience Working	Average	22.9 Year
	Median	23 Year
	Modus	24 Year
	Maximal	IDR 3,925,000
	Minimal	IDR 1,950,000
Fishery Product Revenue	Average	IDR 2,924,333
	Median	IDR 2,875,000
	Modus	IDR 2,750,000
	Maximal	IDR 3,700,000
	Minimal	IDR 1,050,000
Household Expenditure	Average	IDR 1,555,185
	Median	IDR 1,400,000
	Modus	IDR 1,250,000
	Maximal	26 Trip
	Minimal	20 Trip
Number of Trips	Average	23.7 Trip
	Median	24 Trip
	Modus	25 Trip
	Maximal	IDR 2,850,000
	Minimal	IDR 800,000
Fishermen's Income	Average	IDR 1,608,888
	Median	IDR 1,512,500
	Modus	IDR 1,350,000

Based on Table 2, it can be seen that the average exchange rate of fishermen in Ketapang Village, Tangerang Regency is 0.76 < 1 which indicates that they are not prosperous, meaning that fishermen have not been able to meet their household needs. The fisherman's exchange rate which is below number 1 can also be interpreted that the amount of fisherman's expenditure is still greater than the amount of fisherman's fishery income.

Based on Table 3, the number of fishermen who have NTN1 is 20%. The amount of NTN tends to vary, this occurs because consumption expenditures are not fixed, as well as uncertain fisheries revenues caused by different catches, types of fish caught, fishing season, and the price of fish caught [17].

Based on Table 4, obtained data calculated using Microsoft Excel software, which obtained the largest fisherman's exchange rate of 1.45, the smallest fisherman's exchange rate of 0.9, the average fisherman's exchange rate of 0.76, the median fisherman's exchange rate of 0.78 and not There is a mode fisherman's exchange rate because all fishermen's exchange rates are different.

3.4 Analysis of Factors Affecting Fisherman's Exchange Rate

Factors affecting the exchange rate of fishermen in Ketapang Village, Tangerang Regency, can be seen from the existing variables, NTN is the dependent variable while the independent variables such as income, age, last education are independent variables. Regression analysis was performed with the influence of input variables on NTN or the fisherman's exchange rate (Table 5).

The multiple linear regression equation that explains the effect of work experience (X_1), number of trips (X_2), fishery product income (X_3), household expenditure (X_4) on the fisherman's exchange rate (Y) is as follows:

$$Y = a – B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$
$$Y = -43.082 + 0.057X_1 – 0.0474X_2 + 3.753X_3 – 0.834X_4 + e$$

3.5 Statistical Performance Test

3.5.1 Normality test

The purpose of the Normality Test is to test the residuals in the regression model are normally distributed or not. A good regression model should be normally distributed. To test normality, it can be seen from the distribution of residual data. Based on Fig. 1, it can be seen that the residual data (dots) spread around the line and follow the direction of the diagonal line, this result shows that the residuals in the regression model have a normal distribution.

3.5.2 Multicolinearity test

Multicollinearity is a condition or moment of a very strong relationship between some or all of the variables involved in the regression model. This multicollinearity can be detected from the tolerance value of the VIF (variance inflation factor). If the tolerance value > 0.10 and the value of the variance inflation factor. Based on Table 5, it can be concluded that the regression model does not find any multicollinearity problems because all variables have a tolerance value > 0.10 and a VIF value < 10, so the assumption to be free from multicollinearity problems has been fulfilled.

Table 2. Fishermen's exchange rates in Ketapang village, Tangerang Regency

No.	Description	Average (Rp)
1	Fisherman Fishery Business Acceptance	2,924,333
2	Fishermen Expenditure (Fishery Business and Household Consumption)	2,848,017
3	Fisherman's Exchange Rate	0.76

Table 3. Number of fishermen by exchange rate of captured fishermen in Ketapang Village, Tangerang Regency

No.	Fisherman's Exchange Rate	Amount	Percentage (%)
1	<1	20	67
2	1	4	13
3	>1	6	20
	Amount	30	100

Table 4. Respondent fishermen exchange rates in Ketapang Village, Tangerang regency

Parameter	Indicator	Score
	Maximum	1.45
	Minimum	0.19
Fisherman's Exchange Rate	Average	0.76
	Median	0.78
	Modus	-

3.5.3 Heterodasticity test

The heteroscedasticity test is used to determine the presence or absence of heteroscedasticity deviations, heteroscedasticity is the variance inequality of the residuals for all observations in the regression model. To detect this problem, look at the scatterplot graph. If the points are randomly distributed and do not form a pattern, the regression model is free from heteroscedasticity problems. Based on Fig. 2, it can be seen that the graph does not form a pattern and is randomly distributed, this result shows that the regression model is free from the heteroscedasticity problem.

3.5.4 Partial hypothesis test (T-test)

The t test is used to test the ability of each independent variable in explaining the dependent variable in the regression model. The t-test was carried out by comparing t-count with t-table with a confidence level of 5% (0.05). If t count is greater than t table then H0 is rejected. However, if t count is smaller than t table, then H1 is rejected [5]. According to Table 6, it can be seen that the variables X3 and X4 have 0.0 and 0.02, respectively, so it can be concluded that X3 and X4 have the ability to influence the dependent variable while X1 and X2 do not.

Table 5. Analysis of regression results of the effect of variable inputs on fisherman's exhange rate

Variable	Coefficient	Information
X1	0.57	Work experience
X2	-0.474	Number of trips
X3	3,753	Fishery Product Revenue
X4	-0.384	Household Expenditure

Table 6. Testing results of multicollinearity assumption

Independent Variable	*Tolerance*	VIF
X1	0.739	1.353
X2	0.812	1,231
X3	0.595	1,682
X4	0.610	1,638

Table 7. T-test table

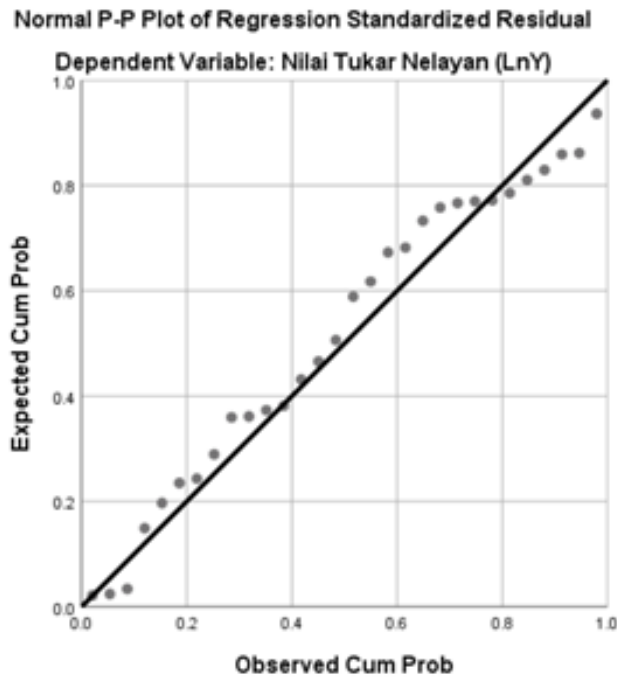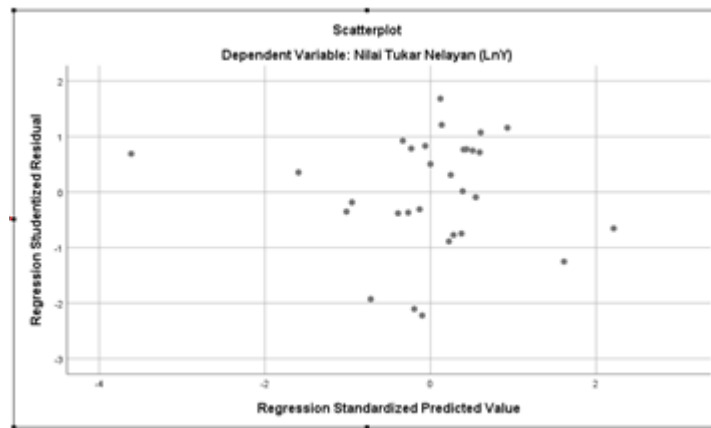| Model	T	Sig.
(Constant)	-4,509	0.000
Work Experience	0.115	0.909
Number of Trips	0.396	0.696
Fishery Product Revenue	4,853	0.000
Household Expenditure	-2.443	0.022

Fig. 1. Normal probability plot

Fig. 2. Heteroscedasticity assumption test results

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.730[a]	.533	.458	.38813

Fig. 3. Coefficient of determination

a. *Predictors: (Constant), Household Expenditure (LnX4), Number of Trips (LnX1), Fishery Product Revenue (LnX3)*
b. *Dependent Variable: The Exhange Rate of Fishermen (LnY)*

3.5.5 Simultaneous hypothesis testing (F-test)

If the value of sig < 0.05 then the independent variables simultaneously (together) have a significant effect on the dependent variable. In addition, if the value of the F-table has a greater value than the F-table, then the independent variable simultaneously affects the dependent variable [14]. In this model, the significance value shows the number 0.001 which means that it simultaneously has an influence on the dependent variable.

3.5.6 Coefficient of determination (R^2)

Based on Fig. 3, the analysis shown using the SPSS 25.0 program shows that the value of R^2 obtained is 0.533, it shows the ability of the independent variable to explain the dependent variable, which is 53.3% or in other words simultaneously (together) all independent variables have an influence of 53.3% on the fisherman's exchange rate, while the remaining ($1-R^2$) 46.7% is the contribution of the influence given by other factors not examined.

4. CONCLUSION

Based on the results of the study, it was concluded that the average fisherman exchange rate (NTN) in Ketapang Village, Tangerang Regency was 0.76 or less than 1, meaning that Bubu Fishermen in Ketapang Village, Tangerang Regency had not been able to meet their household needs or in In other words, the amount of revenue is still lower than the amount of expenditure. The factors that influence the exchange rate of fishermen in Ketapang Village, Tangerang Regency are fishery product receipts and household expenditures.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL

All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws where applicable.

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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