

ANALYSIS OF FACTORS INFLUENCING INCOME OF OUTBOARD MOTOR FISHERMAN BOATS IN PANDAN DISTRICT TAPANULI CENTRAL DISTRICT

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Abstract

This research was conducted in Pandan District, Tapanuli Tengah Regency from October to November 2022. This research was conducted because there was a significant difference in income between outboard motor fishermen in Muara Nibung Village and outboard motor fishermen in other sub-districts in Pandan District. Fishermen in Kelurahan Muara Nibung have the lowest income among the 22 villages/kelurahan in Pandan Subdistrict, even though the kelurahan has fishery potential that is not inferior to other kelurahan/villages. This difference of opinion can be caused by factors that influence opinion such as experience, distance traveled, length of time at sea and operational costs used by fishermen in fishing activities. This study aims to analyze the influence of experience, distance traveled, length of time at sea and operational costs on fishermen's income in Pandan District, Tapanuli Tengah Regency. The data analysis method used is Multiple Linear Regression. The results showed that the coefficient of determination (Adjust R^2) was 0.929 or 92.9%. The percentage influence of experience, distance traveled, and length of time at sea is able to explain income by 92.9%, the remaining 7.1% is explained by other variables outside the model. The results of the F test simultaneously experience, mileage, and length of time at sea have a significant effect on fishermen's income. The results of the partial t test show that experience, distance traveled, and length of time at sea have a significant positive effect on the income of fishermen in Pandan District, Tapanuli Tengah Regency.

Keywords: *Income, Outboard Motor Boat Fisherman, Multiple Linear Regression*

1. INTRODUCTION

Geographically, Indonesia stretches from 60° North Latitude to 110° South Latitude and 920° to 1420° East Longitude, consisting of 17,504 large and small islands. The sea area is 5.4 million km², dominating Indonesia's total territorial area of 7.1 million km², with a coastline length of 95,161 km. This potential places Indonesia as a country that is blessed with large marine resources including rich biodiversity and non-biological diversity (KKP, 2014).

One of the districts that has an abundance of marine resources is Central Tapanuli Regency, this district is located on the west coast of Sumatra Island and is directly adjacent to the Indian Ocean, so it is rich in marine products. In Central Tapanuli Regency there are several sub-districts whose areas are coastal areas. One of them is Pandan District. Pandan District is the capital of Central Tapanuli Regency which consists of 22 villages/kelurahan and are centers of production of marine catches and most of the inhabitants work as fishermen.

Based on data from the Maritime Affairs and Fisheries Service of Central Tapanuli Regency, in 2021 in Pandan District the number of fishermen will reach 3,227 fishermen. Where the fishermen consist of 3 types of fishermen, namely bagan tancap fishermen, outboard motor boat fishermen and motor boat fishermen. There are 780 lift net fishermen, 1,427 outboard motor boat fishermen and 1,020 motor boat fishermen (Central Tapanuli Maritime and Fishery Service, 2022).

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Sonia Muslimah Sinaga, Adhiana, Riani

The largest number of fishermen are fishermen who use motorized boats outboard which amounted to 1,427 people. The distribution of the number of fishermen by village/kelurahan in Pandan District is as follows.

Table 1.1 Number of Outboard Motor Boat Fishermen by Village/Kelurahan

Village	number of fishermen
Pandan	151
Hajoran	120
Aek Tolang	98
Lubuk Tukko	20
Sibuluan Indah	19
Sibuluan Nauli	31
Aek Sitio-Tio	-
Sibuluan Raya	32
Kalangan	115
Aek Garut	-
Sitio-Tio Hilir	-
Pandan Wangi	29
Lubuk Tukko Baru	131
Sibuluan baru	45
Sibuluan Terpadu	23
Sihaporas Nauli	-
Pasar Baru	-
Budi Luhur	-
Kalangan Indah	109
Mangga Dua	-
Muara Nibung	391
Hajoran Indah	113
Total	1.427

Source: Central Tapanuli Maritime and Fisheries Service, 2022

From Table 1.1 above it can be seen that the number of outboard motor boat fishermen in Pandan District in 2021 is 1,427. The highest number of fishermen was in the Muara Nibung Village, namely 391 people and the lowest was in the Sibuluan Indah Village, with 19 people. Even though these fishermen are in the same water area, the average income of fishermen in the sub-district is different. The following can be seen the average income of outboard motor boat fishermen in the table below.

Table 1.2 Average Income of Outboard Motor Boat Fishermen

Village	Monthly Income
Pandan	3.200.000
Hajoran	3.100.000
Aek Tolang	2.100.000
Lubuk Tukko	2.500.000
Sibuluan Indah	2.045.000
Sibuluan Nauli	2.000.000
Aek Sitio-Tio	-
Sibuluan Raya	2.005.000
Kalangan	3.030.000
Aek Garut	-
Sitio-Tio Hilir	-
Pandan Wangi	2.070.000

Lubuk Tukko Baru	2.900.000
Sibuluan baru	2.030.000
Sibuluan Terpadu	2.700.000
Sihaporas Nauli	-
Pasar Baru	-
Budi Luhur	-
Kalangan Indah	3.050.000
Mangga Dua	-
Muara Nibung	1.100.000
Hajoran Indah	3.020.000

Source: Department of Fisheries and Maritime Affairs of Central Tapanuli Regency, 2022

The table shows that the average income of outboard motor fishermen for each village/kelurahan in Pandan District can be categorized into the lower middle income level. Of the 22 villages/kelurahan in Pandan Subdistrict, there is a significant difference in income where Pandan Subdistrict is the subdistrict with the highest average income of IDR 3,200,000 and the lowest income is in Muara Nibung Subdistrict with an average income of IDR 1,100,000.

The large potential for natural resources in the fisheries and marine sectors in Central Tapanuli, especially in the Muara Nibung Village, has not been able to improve the welfare of its fishermen. The low level of fishermen's welfare is closely related to the low income derived from fishing activities. Even though Muara Nibung Village has potential like other villages. Based on this potential, fishermen in the Muara Nibung sub-district should be able to prosper their lives. However, the actual condition is not the case, most of the fishermen in Muara Nibung Village still live in poor conditions because the average income generated is very low, which is only IDR 1,100,000/month, where this value is lower than the average income of fishermen in other villages. in Pandan District. Based on this background, the authors are interested in conducting this research.

2. LITERATURE AND THEORETICAL REVIEW

Fishermen are residents who live on the coast and their source of economic life depends directly on processing marine resources. The fishing community is a group of people who make a living from the sea and live in coastal or coastal villages (Sastrawidjaya, 2002). Outboard motor boat fishermen are fishermen who use a diesel engine as the driving force for their boat, and the motor/engine is placed outside both the tail and the side of the boat. This outboard motor can be installed on a jukung or a plank boat. Plank boats that use outboard motors are included in the category of outboard motor boats (Central Bureau of Statistics, 2013).

According to Sukirno (2006) income is the amount of income received for his work during a certain period, whether daily, weekly, monthly or yearly. The income of fishing communities depends on the potential utilization of fishery resources in the sea. The income of fishing communities directly or indirectly will greatly affect their quality of life, because income from sailing is the main or even the only source of income for them, so the size of the income will greatly influence their lives, especially on their ability to manage the environment. their place of life.

According to Sujarno 2008, factors that affect fishermen's income include experience, distance traveled, length of time at sea and operational costs. Experience as a fisherman, directly or indirectly, has an influence on fishing results. The longer a person has experience as a fisherman, the greater the results from fishing and income earned (Yusuf 2003). According to Masyhuri and Asnawi (2009) mileage will affect fishermen's income because long distances can incur more costs but not necessarily the catch is also large, thereby affecting the income to be earned.

Wiyasa (2017) suggests that worker productivity is also influenced by the amount of hours worked or the length of time spent working. Mariani (2014) states from the results of his research that the form of the influence of operating costs at sea on fish catches has a significant positive

ANALYSIS OF FACTORS INFLUENCING INCOME OF OUTBOARD MOTOR FISHERMAN BOATS IN PANDAN DISTRICT TAPANULI CENTRAL DISTRICT

Sonia Muslimah Sinaga, Adhiana, Riani

effect, if the total operational costs are greater, the number of fish catches obtained by fishermen will be greater.

3. IMPLEMENTATION METHOD

This research was conducted in Muara Nibung Village, Pandan Wangi Village, and Pandan Village, Pandan District, Central Tapanuli Regency, North Sumatra Province. The object of this study were outboard motor boat fishermen in Muara Nibung Village, Pandan Wangi Village, and Pandan Village, Pandan District, Central Tapanuli Regency. The scope of this research is limited to the analysis of the factors that affect the income of fishermen in Pandan District, Central Tapanuli Regency.

The sampling technique in this study was carried out deliberately by setting Muara Nibung Village, Pandan Wangi Village and Pandan Village as samples in this study with the consideration that each of these villages is a village that has fishermen with the lowest, medium and highest average income among urban villages. others in Pandan District.

It is known that the population of outboard motor fishermen in Muara Nibung Village is 391 people, Pandan Wangi Village is 29 people and Pandan Village is 151 people. So that the total population is 571 people. The number of samples is determined by the Taro Yaname and Slovin Formulas. The formula is as follows:

$$n = \frac{N}{Nd^2 + 1}$$

Where :

n = Number of sample members

N = Number of population

d2 = Precision (precision set at 15%), then:

$$n = \frac{571}{571(0.15)^2 + 1}$$

n = 41 orang

In choosing the sample in this study, the authors used Proportioned Random Sampling, this technique was used because the population is not homogeneous and proportionally stratified. The strata referred to in this study are sub-districts with different average incomes. The proportional allocation formula is as follows:

$$n = \frac{Ni}{N} \cdot n$$

Where :

ni = number of sample members according to strata n = total number of sample members

Ni = number of members of the population according to strata N = total number of members of the population

Then the number of sample members is as follows.

Table 3.1 Number of Sample Members by Strata.

Village	Number of Population Members by Strata (Ni)	Number of Sample Members by Strata (ni)
Muara Nibung	391	28
Pandan Wangi	29	2
Pandan	151	11
Total	571	41

Source: Primary Data (processed), 2022

From Table 3.1 above it can be seen that according to sub-district/village strata, there are 28 people in Muara Nibung Village, 2 people in Pandan Wangi Village and 11 people in Pandan Village. So that the total sample members amounted to 41 people.

This study uses multiple linear regression analysis to see the effect of the independent variables on the dependent variable. The stages of data analysis used consist of:

1) Classical Assumption Test

Before carrying out the regression analysis, the classical assumption test was first carried out to obtain a good and correct regression equation model. A model is said to be good as a predictor if it has the best linear unbiased properties of an estimator. In addition, a model is said to be good enough and able to predict if it has passed a series of classical assumption tests that underlies it. The classic assumption test used is the normality test, multicollinearity test, and heteroscedasticity test.

2) Multiple Linear Regression Analysis

Regression analysis is one of the data analysis techniques in statistics which is often used to examine the relationship between several variables and predict a variable. Mathematically, the analysis model is as follows:

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + b_4 X_4 + e$$

Note: Y = fishermen's income

A = Constant

b1-5 = Regression coefficient

X1 = Experience

X2 = Mileage

X3 = Sea Time

X4 = Operational Cost

e = Residual

3) Statistical Test

1. Coefficient of Determination (R²)

The coefficient of determination which aims to see how far the ability of the independent variables used in the model is able to explain the variance of the dependent variable.

2. F test

carried out to test how far the influence of the independent variables together in influencing the independent variables. The confidence level used is 85% or at a significant level of 15% ($\alpha = 0.15$) with the following criteria:

- If the significant value of $F \leq 0.15$, simultaneously experience, distance travelled, length of time at sea and operational costs have a significant effect on income.
- If the significant value of $F > 0.15$, simultaneously experience, distance traveled, length of time at sea and operational costs have no significant effect on the income variable.

3. Test t

The t test is used to test whether each independent variable contained in the model has a significant effect on the dependent variable studied individually, with the test criteria based on a significant value of alpha 15% (0.15) with the assumption that:

- If the significant value of $t \leq 0.15$ then partially experience, distance traveled, length of time at sea and operational costs have a significant effect on income.
- If the significant value of $t > 0.15$, partially experience, distance traveled, length of time at sea and operational costs have no significant effect on the income variable.
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4. RESULTS AND DISCUSSION

4.1 Characteristics of Respondents

Umur

Table 4.1 Characteristics of Respondents by Age

Umur (Tahun)	Jumlah Nelayan (Orang)	Persentase (%)
Produktif (15-64)	41	100
Tidak Produktif (≥ 65)	0	0
Total	41	100

Source: Primary Data (processed), 2022

Table 4.1 shows that the outboard motor boat fishermen who are the respondents are all of a productive age, namely at the age of 15-64 years with a total of 41 people and a percentage of 100%. This means that fishermen who are respondents still have good physical strength so that they can carry out fishing activities in the sea properly. This is in accordance with research conducted by Putri and Setiawina (2013) which states that the productive age of fishermen ranges from 15-64 years which is the ideal age for workers.

Number of Family Dependents

Table 4.2 Characteristics of Respondents According to Number of Family Dependents

Number of Family Dependents	Number of Fishermen (Person)	Persentase (%)
Sedikit (1-3)	17	41,46
Sedang (4-6)	23	56,09
Banyak (>6)	1	2,43
Total	41	100

Source : Primary Data (processed), 2023

Based on Table 4.2 it shows that the fishermen who were respondents in this study had a moderate number of dependents compared to fishermen who had a few and a large number of dependents. The grouping of the number of dependents of fishermen's families is based on the Central Bureau of Statistics.

Level of education

Table 4.3 Characteristics of Respondents by Education Level

Education Level	Number of Fishermen (Person)	Persentase (%)
SD	31	75,60
SMP	6	14,63
SMA	4	9,75
Total	41	100

Source : Primary Data (processed), 2023

Based on Table 4.3, it shows that the educational level of fishermen who are the largest respondents is at the elementary level. The number of fishermen is 31 people or 75.60%. While the smallest frequency is at the high school level with a total of 4 people or 9.75%. From the research results it is known that the education level of fishermen is still relatively low, namely for 6 years or at the elementary school level, so fishermen are still lacking in using technology such as the use of modern fishing gear and the use of fish detection devices.

Normality test

The normality test used in this study is an approach with a P-plot graph. Based on Figure 4.1 it can be seen that the data spreads around the diagonal line and follows the direction of the

diagonal line which indicates that the data in this study are normally distributed and meet the normality assumptions.

Multicollinearity Test
Table 4.4 Multicollinearity Test Results

Variabel	Tolerance	VIF	Keterangan
Experience	0,215	4,662	Non Multikolinearitas
Mileage	0,197	5,064	Non Multikolinearitas
Long Sea	0,208	4,801	Non Multikolinearitas
Operating costs	0,098	10,253	Multikolinearitas

Source : Primary Data (processed), 2023

Based on Table 4.4 it can be seen that the VIF value for each variable of experience, distance traveled, length of time at sea is less than 10 and the tolerance value is greater than 0.100 so that multicollinearity does not occur. However, the operational cost variable has a VIF value of greater than 10 and a tolerance value of less than 100, thus the model is declared to have multicollinearity.

If the regression model has multicollinearity, then one way to overcome this problem is to replace or exclude variables that have a high correlation. In this research, the variable that is issued is the operational cost variable. The results of the multicollinearity test after the operational cost variables are removed are as follows.

Table 4.5 Multicollinearity Test Results

Variabel	Tolerance	VIF	Keterangan
Experience	0,244	4,104	Non Multikolinearitas
Mileage	0,240	4,169	Non Multikolinearitas
Long Sea	0,476	2,100	Non Multikolinearitas

Source : Primary Data (processed), 2023

From the table above, it can be seen that the VIF value for each variable of experience, distance traveled, and length of time at sea has a value less than 10 and a tolerance value greater than 0.100. So it can be concluded that there is no perfect correlation between the variables of experience, distance traveled and length of time at sea, so that the multicollinearity test has been fulfilled.

Heteroscedasticity Test

The normality test used in this study is an approach to the Scatter Plot graph. Based on Figure 4.2 of the Scatter Plot Graph above, it can be seen that the dots spread randomly and do not form a clear pattern. This shows that there is no heteroscedasticity in the regression model and is feasible to be used to predict the effect of the dependent variable based on the independent variable input.

Multiple Linear Regression Analysis
Table 4.6 Results of Multiple Linear Regression Analysis Using SPSS 16.0

Variabel	Koefisien	Thitung	Sig.t
(Konstanta)	-1,994E6	-6,620	0,000
Experience	170824,343	5,097	0,000
Mileage	219870,762	3,239	0,003
Long Sea	10823,717	5,551	0,000
Adjust R ² = 0,929			
Sig F = 0,000			

Source : Primary Data (processed), 2023

Based on Table 4.6 it can be seen that the coefficient values of the variables used in this study. Then the resulting regression equation is as follows:

$$Y = -1,994E6 + 170824,343 X_1 + 219870,762 X_2 + 10823,717 X_3 + e$$

Statistic test

1. Coefficient of Determination (Adjusted R²)

Based on Table 4.6, it is known that the value of Adjusted R Square is 0.929, meaning that the independent variables, namely experience, distance traveled, length of time at sea and variable operational costs are able to explain the dependent variable (fisherman's income) of 92.9%, the remaining 7.1% is explained by other variables outside model.

2. F test

Based on the results of the data analysis in Table 4.6, a significant value of $0.000 < 0.15$ is obtained, which means that simultaneously experience, travel distance, length of time at sea and operational costs have a significant effect on fishermen's income.

3. Test t

The test results of each variable are as follows:

1. The Effect of Experience on Fishermen's Income

The results of the analysis show that partially experience has a significant effect on fishermen's income as evidenced by the significant value of the experience variable ($0.000 < 0.15$). The value of the experience regression coefficient is positive, which means that the longer the fishermen experience at sea, the greater the opportunities for fishermen to increase their income.

In this study fishermen from Pandan Village had a maximum experience of 28 years with an income of IDR 10,318,000/month, fishermen from Pandan Wangi Village had 21 years experience with an income of IDR 5,557,500/month and fishermen from Muara Nibung village had a maximum experience of 20 years with an income of 4,220,000/month. This shows that the longer the fishermen's experience, the higher the income generated.

The results of this study are in line with research conducted by Citrayani Giri and Urmila Dewi (2017) which states that the experience variable has a positive and significant effect on income, where the length of time a person goes to sea or experience has a positive and significant effect because the longer a person works as a fisherman, the wider knowledge in fishing, in seeing the cardinal directions, predicting the right time to catch fish, recognizing risk signs and readiness to reduce risks that can affect income. This shows that the hypothesis in this study is accepted.

2. Effect of Mileage on Fishermen's Income.

The results of the analysis show that partially mileage has a significant effect on fishermen's income, as evidenced by the significant value of the mileage variable ($0.003 < 0.15$). The value of the regression coefficient for mileage is positive, which means that the farther the distance traveled by fishermen, the greater the opportunity for fishermen to increase their income. This shows that the hypothesis in this study is accepted.

In this study, fishermen from Pandan Village covered a maximum distance of 15 miles with an income of IDR 10,318,000/month, fishermen from Pandan Wangi Village traveled a distance of 6 miles with an income of IDR 5,557,500/month and fishermen from Muara Nibung village traveled a maximum distance of 8 miles. with an income of 4,220,000/month. This shows that the farther the distance traveled by fishermen, the income generated will also increase. This research is in line with research conducted by Rismadi (2016) which states that the mileage variable has a positive and significant effect on the income of fishermen in Southwest Aceh District.

3. Effect of Long Time at Sea on Fishermen's Income

The results of the analysis show that the length of time at sea has a significant effect on fishermen's income, as evidenced by the significant value of the variable length of time at sea ($0.000 < 0.15$). The regression coefficient value for long fishing hours is positive, which means that

the longer fishing time used by fishermen, the income will also increase. That matter this is because if the longer fishermen do fishing, the greater the chance for fishermen to get more fish.

In this study, fishermen from Pandan Village caught fish for a maximum of 384 hours/month or 32 hours/trip with an income of IDR 10,318,000/month, fishermen from Pandan Wangi Village caught fish for a maximum of 192 hours/month or 14 hours/trip with an income Rp.3,947,000/month and fishermen from Muara Nibung sub-district catch fish for a maximum of 288 hours/month or 24 hours/trip with an income of 3,480,000/month. This shows that the results of data analysis are in accordance with what happened in the field where the longer fishermen do fishing, the higher the income generated.

The results of this study are in line with the research conducted by Wardana and Yuliarmi (2018) which states that the variable length of time at sea has a positive and significant effect on the income of fishermen in Serangan Village, South Denpasar District, where the greater the hours worked for a fisherman, the greater the output that will be produced. which will ultimately increase the amount of income earned, this is because the longer the fishermen spend their time at sea, the more fish they get, so their income will increase. This shows that the hypothesis in this study is accepted.

5. CONCLUSION AND SUGGESTION

Conclusion

Factors affecting fishermen's income in Pandan District, Central Tapanuli Regency which were analyzed using multiple linear regression models, in 3 independent variables (experience, travel distance, and length of time at sea) were included in the model where the three independent variables simultaneously and partially had a significant effect on fishermen's income.

Suggestion

Based on the results of the research and conclusions above, the suggestions that the writer can give are as follows.

1. In an effort to increase income, it is hoped that outboard motor boat fishermen can increase the length of time at sea because this variable has a significant influence on increasing fishermen's income and this variable allows it to be added.
2. It is hoped that the government will be able to make a policy on reducing the price of gasoline-type fuels in order to reduce the costs incurred by fishermen in fishing and provide assistance in the form of fish detection devices to introduce new technology to fishermen.
3. It is hoped that future researchers can continue and expand this research by adding other variables such as fuel prices, number of days at sea and weather.

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ANALYSIS OF FACTORS INFLUENCING INCOME OF OUTBOARD MOTOR FISHERMAN BOATS IN PANDAN DISTRICT TAPANULI CENTRAL DISTRICT

Sonia Muslimah Sinaga, Adhiana, Riani

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