

Analysis of Fishermen's Income in The Seribu Archipelago

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ABSTRACT

This region of Indonesia has great potential for national development and is aimed at increasing economic growth for the better. The low welfare of fishermen, especially traditional fishermen, is a problem that hinders the development of fisheries zones. The purpose of this article is to describe the partial and simultaneous influence of capital, technology, fishing time and fishing experience on fishermen's income in the Seribu Islands. This research is quantitative research with multiple linear regression quantitative descriptive data analysis methods. The analysis results show that the variables capital and time at sea have a significant effect on fishermen's income in the Seribu Islands, while the fishing experience variable does not have a significant effect on the income of fishermen in the Seribu Islands. Then capital, technology, time at sea and sea experience simultaneously have a significant effect on the income of fishermen in the Seribu Islands. Based on research findings it is hoped that fishermen can increase their capital by extending their fishing time and traveling further to optimize their results. It is hoped that the Seribu Islands Government can contribute to policy-making and provide more attention to fishermen by providing support, guidance, and guidance on how to increase fishing.

Keywords: Capital, Income, Fishermen, Time at Sea, Fishing Experience.

JEL Classification: E71, O13, O15

INTRODUCTION

As one of the world's major maritime nations, Indonesia boasts a wealth of natural resources, including a wide variety of marine products and fish (Akbar, 2022). The fishery's natural resources yield marine products like seaweed and pearls, as well as fisheries such as octopus, tuna, squid, crab, and shellfish (Ariska & Prayitno, 2019). Fishing is the term used to describe work done for a living in other aquatic environments and fisheries (Siregar et al., 2022). It's common knowledge that fishermen have one of the hardest jobs in the industry.

About 260 million people worldwide depend on marine fisheries for their livelihood. Fisheries can alter community resilience and affect many coastal communities on the level of poverty by contributing to food security and health (Pollnac et al., 2015). Aryanto and Sudarti found that fish catches have a significant impact on fishermen's income levels; the more fish caught, the more money they can keep for their own consumption needs (Aryanto & Sudarti, 2017). This can be understood as making sure that everyone has access to the basic needs of life, which lowers the population of impoverished individuals. The lack of basic necessities or obstacles to employment or education may be the cause of this poverty. Lack of basic necessities or difficulty finding employment or education may be the cause of this poverty. As a result of the fact that In increasing production, many fishermen are still said to be unable and that their earnings frequently fluctuate significantly from year to year (Nabila & Aisyah, 2023), resulting in significant financial risks, the fishing industry is actually still often associated with poverty (Pranata, 2019).

Even though fishermen make an important contribution to the national economy, the still weak of fishermen still weak (Purcell et al., 2016), is a case that becomes an obstacle in the fisheries sector in achieving sustainable development, there has been an increase in the welfare of coastal communities, fishermen and fish keepers (Ahmad Ridha, 2017). In order to accomplish this, stakeholders must play a significant role in an exhaustive evaluation of the evolution of fish stocks in every coastal resident. Ultimately, it is hoped that fishermen will be able to contribute to the interests of the national or certain regional economy towards the maritime economy.

The Seribu Islands is a different area from Jakarta, a city that is famous for its bustling and busy city center, as well as being a fishing and tourist spot in the middle of the sea. The 110 islands in the Seribu Islands with a land area of 8.88 km² and a sea area of 6,997.50 km² have a population of 25,721 people in 2021. Of the 110 islands, eleven islands are inhabited and six of them are Pari Island, Pramuka Island, Tidung Island, Kelapa Island, Harapan Island and Payung Island - are classified as Marine Protected Areas (DPL) (Muryono, 2021). Most of the population still lives as fishermen. Many people think that fishing is a hard way to make a living.

The income of fishermen can be used to gauge their level of welfare. Capital can affect a fisherman's income; the more capital, the greater the chance of catching. In this instance, the working capital that fishermen typically possess can take the shape of boat capital as well as capital for fishing-related expenses like fuel, ice blocks, bait, and food and drink for on-the-road consumption. According to (Djulus et al., 2022; Rostiana et al., 2022; Ruswanti et al., 2019), what is meant by working capital is the total amount of money invested over a specific time period with the primary goal of establishing a company (Che Arshad & Irijanto, 2023; Hamijaya & Suryaman, 2023; Suprapti, 2022) in order to generate short-term income. Fishermen need to have enough money to launch a business. According to (Putra, 2019), this money is required to purchase fishing gear, boats, motorbikes, and other items that will enhance the quantity of catches. The hours that fishermen work vary when conducting fishing operations; typically, they depart after dawn. Depending on the weather and the skill of the fishermen, this activity can be performed multiple times a day (Trisnawati et al., 2018).

The income of fishermen depends on capital and the seasons, so without the use of advanced technology, it cannot function. High-quality technology can boost fishing productivity and catch rates. The amount of fishermen's welfare does not rise when they use basic fishing gear because the fishing area and yields are restricted. The amount of money earned will be significantly impacted by the use of cutting-edge technology (Rahmasari, 2017).

This study intends to investigate the partial and simultaneous influences of capital, technology, fishing time, and experience on the income of fishermen in the Seribu Islands, as was previously mentioned in the background of the topic. It is intended that the results of this study will serve as a source of information and direction for decision-makers as they develop policies about the welfare of fishermen in the Seribu Islands region.

METHODE

Multiple linear regression is a quantitative descriptive analysis method used in this study (Dawan et al., 2020). Population is an area of generalization of subjects and objects with certain characteristics and quantities determined by researchers for analysis and then conclusions are drawn. The population of this research is the people of the Seribu Islands who make their living as fishermen, totaling 4,178 people. The sample is part of the characteristics and quantity found in the population used in research (Martono, 2011). When sampling, a random sample is used, a strategy that ensures that each member of the population has the same chance of being selected as a random sample, regardless of the population strata (Manik et al., 2023; Sugiyono, 2022).

This sample represents part of the total population and composition of boat-owning fishermen. The Slovin approach can be used to calculate the sample size.

So that research findings can be widely applied, the number of samples used in the Slovin technique must be representative. The following is Slovin's formula for calculating samples:

$$n = \frac{N}{1 + N(e)^2} \dots \dots \dots (1)$$
$$n = \frac{4.178}{(1 + 4178 (0,1)^2)}$$
$$n = \frac{4.178}{42,78} = 97,66 = 98$$

98 respondents from the entire population were used as the research sample, according to the estimates above. Better test findings and easier data processing are the goals of this.

The hypothesis put forward in this research is:

- Ha₁ : The income of fishermen in the Seribu Islands is influenced by capital
- H0₁ : Fishermen's income in the Seribu Islands is not influenced by capital
- Ha₂ : The income of fishermen in the Seribu Islands is influenced by the length of time they have been at sea
- H0₂ : The income of fishermen in the Seribu Islands is not influenced by the length of time at sea
- Ha₃ : The income of fishermen in the Seribu Islands is influenced by their fishing experience
- H0₃ : Fishermen's income in the Seribu Islands is not influenced by fishing experience
- Ha₄ : Fishermen's income in the Seribu Islands is influenced by capital, time going to sea and the experience of going to sea simultaneously
- H0₄ : Fishermen's income in the Seribu Islands is not influenced by capital, time going to sea and the experience of going to sea simultaneously.

According to the framework for thinking about the relationship between capital, technology, length of time at sea, and sea experience can be obtained described as follows:

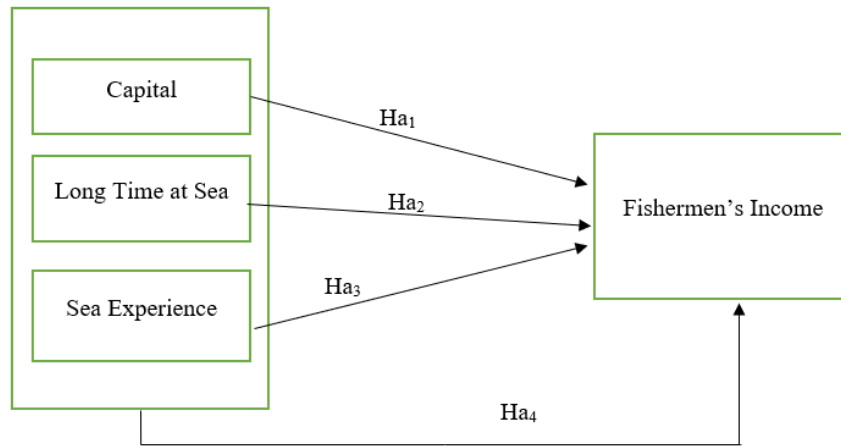


Figure 1. Research Thinking Framework

RESULT

Features of the Respondents According to Age. The table below provides an age-based description of the respondents:

Table 1. Respondent's Age

Age	Total	Percentage
11 - 20 years	4	4,08%
21 - 30 years	13	13,26%
31 - 40 years	25	25,51%
41- 50 years	24	24,49%
> 50 years	32	32,65%
Total	98	100%

Source: Primary data processed, 2023

Based on the table above, it can be concluded that the respondents in this study were dominated by the age range above 50 years, namely 32.65%. Respondents' Features According to Education Level. The table below describes the respondents according to their educational attainment:

Table 2. Respondent's Education

Education	Total	Percentage
Did not complete elementary school	31	31,63%
SD/MI	22	22,45%
SLTP/MTs	29	29,59%
SMA/SMK	16	16,33%
Total	98	100%

Source: Primary data processed, 2023

It is clear from the data in the above table that the study's respondents had more education than a high school diploma or its equivalent. Characteristics of Respondents Based on Income. Description of respondents based on education level can be seen in the table below:

Table 3. Respondent's Income

Income	Total	Percentage
Rp. 500.000 – 1.000.000,-	15	15,31%
Rp. 1.000.001 – 1.500.000,-	64	65,31%
Rp. 1.500.001 – 2.000.000,-	19	19,38%
Total	98	100%

Source: Primary data processed, 2023

Based on the data in the table above, it shows that the majority of respondents have an income of between Rp. 1.000.000,- up to Rp. 1.500.000,-

The output results of the normality test with one Kolmogorov-Smirnov sample are as follows:

Table 4. Normality Test Results

		Unstandardized Residual
N		98
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	1.54015968
	Most Extreme Differences	
	Absolute	.074
	Positive	.074
	Negative	-.049
Tes Statistic		.074
Asymp,Sig. (2-tailed)		.200 ^{c,d}

The data studied was normally distributed, as can be concluded from the findings of the table above, which shows that the Kolmogorov Smirnov one sample method normality test produced a result of 0.200, greater than the significance level of 0.05.

The results of the classical multicollinearity assumption test can be seen from the following table.

Table 5. Multicollinearity Test Results

Model	Unstandardized Coefficients		Unstandardized Coefficients Beta		Collinearity Statistic		
	B	Std. Error	t	Sig.	Tolerance	VIF	
1 (Constant)	4.462	1.666	2.678	.009			
Capital	.454	.099	.421	4.582	.000	.586	1.707
Long Time at Sea	.408	.099	.378	4.118	.000	.587	1.705
Sea Experience	-.097	.059	-.116	-	.103	.997	1.003
				1.647			

Based on the table above, from the VIF (Variance Inflation Factor) each independent variable has a VIF < 10. the capital variable is 2.044 < 10, the technology variable amounting to 1.583 < 10 and the length of time at sea

variable is $1.766 < 10$, the fishing experience variable is $1.005 < 10$, as well tolerance value > 0.10 . Where the capital variable (X1) is 0.489, the technology variable (X2) is 0.632, the old variable going to sea (X3) of 0.566, and the fishing experience variable (X4) is 0.995. So it can be concluded that the regression model is free from multicollinearity.

The heteroscedasticity results shown in the image below are based on data management:

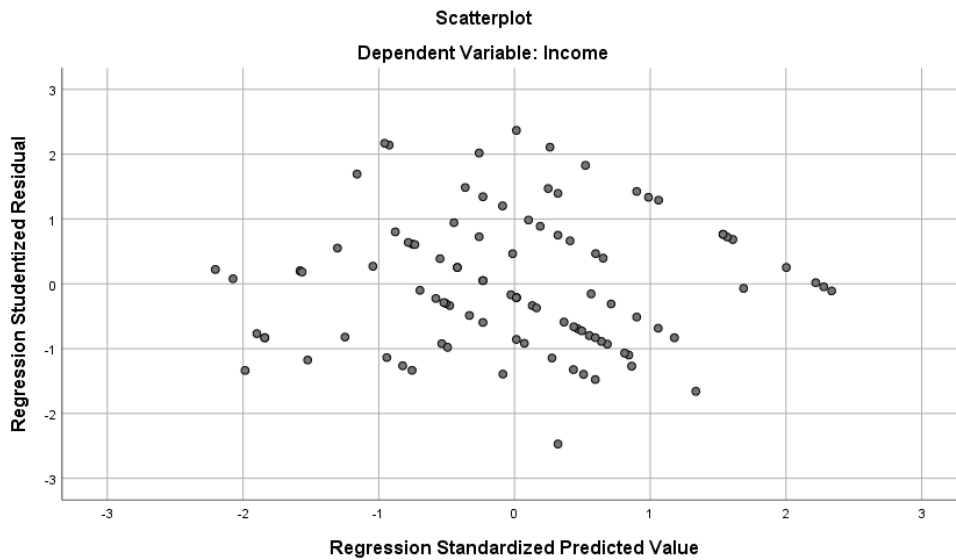


Figure 2. Heteroscedasticity Test Results

Source: Data Processing

The previous scatterplot graph may appear to have a random distribution with zero points because the results show no heteroscedasticity. Factors Affecting the Income of Seribu Islands Fishermen. Based on data analysis using econometrics model, a multiple linear analysis test was conducted for this study.

Table 6. Multiple Linear Analysis Test Result

Model	Unstandardized Coefficients		Standardized Coefficients Beta		t	Sig.
	B	Std. error				
1 (Constant)	4.462	1.666			2.678	.009
Capital	.454	.099	.421		4.582	.000
Long Time at Sea	.408	.099	.378		4.118	.000
Sea Experience	-.097	.059	-.116		-1.467	.103

The regression equation from the table above is:

$$Y = 4.462 + 0.454X_1 + 0.408X_2 - 0.097X_3 \dots \dots \dots (2)$$

The constant has a value of 3,188, meaning that the income variable (Y) stays at 3.188 because the variable values of capital (X1), time at sea (X2), and sea experience (X3) are constant or zero. With constant assumptions for the other

independent variables, income will increase by 45.4% if capital (X1) increases by 1%, according to the regression coefficient of 0.454. With a coefficient of 0.408 for the length of time at sea variable (X2), income will rise by 40.8% for every 1% increase in for the length of time at sea, assuming that all other independent variables remain constant. The regression coefficient for the fishing experience variable (X4) is -0.97, which means that if fishing experience rises by 1%, income will increase by -90.7%, assuming all other independent variables stay constant. Coefficient of Determination Test. The table below displays the results of the Adjusted R Square values:

Table 7. Coefficient of Determination Test Results (R2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.731 ^a	.535	.520	1.56454

The aforementioned table illustrates how capital variables (X1), time at sea (X2), and sea experience (X3) all have a 52.0% impact on income (Y). In the meantime, variables not included in this study had an impact on the remaining 48.0%. The table below displays the findings of the F test:

Table 8. F Test Result

	Model	Sum of Squares	df	Mean square	F	Sig.
1	Regression	264.732	3	88.241	36.049	.000 ^b
	Residual	230.093	94	2.448		
	Total	494.816	97			

It is known that the calculated F in the ANOVA model is 36.049 based on the output above, even though the F table is the same as $F(k; n-k) = F(3; 98-3)$. The F table value resulting from $F = (3.95)$ is 2.70. These figures demonstrate that capital, time spent at sea, and fishing experience all have an equal impact on the money made by fishermen in the Seribu Islands ($F \text{ count } 36.049 > F \text{ table } 2.70$). Therefore, it is reasonable to assume that factors such as capital, technology, time spent at sea, and fishing experience affect the income of fishermen in the Seribu Islands. It is known that three independent variables capital, time at sea, and sea experience have an impact on fishermen's revenue in the Seribu Islands based on the findings of partial variable tests (each). Below is a more detailed breakdown of the factors influencing fishermen's income in the Seribu Islands. It is known that three independent variables capital, time at sea, and sea experience affect fishermen's revenue in the Seribu Islands based on the findings of partial variable tests (each). Below is a more detailed breakdown of the factors influencing fishermen's income in the Seribu Islands. For the capital variable (X1), the significance value is $0.000 < 0.05$ and the t count is $4.582 > t \text{ table of } 1.985$. This illustrates how the income variable in the Seribu Islands is significantly impacted by capital. The variable length of time at sea (X2) has a significance level of $0.000 < 0.05$ with a computed t of $4.118 > t \text{ table of } 1.985$. This indicates that in the Seribu Islands, the revenue variable is significantly impacted by the fishing time

variable. The seafaring experience variable (X3) has a significant value of $0.103 > 0.05$ and a calculated t of $-1.647 < t$ table of 1.985 . This shows that in the Seribu Islands, fishing skill has little effect on the sea experience variable.

DISCUSSION

The study's findings indicate that there will be more opportunities for fishermen to make money depending on the amount of capital used. The results of this study are corroborated by research (Konoralma et al., 2020) that demonstrates capital has a positive effect on fishermen's income. These findings are consistent with a study (Gonibala et al., 2019; Wafiroh et al., 2023) that looked at how capital and production costs affected the income of MSME's and discovered that capital significantly affected the income of fishermen. Aside from that, the identical study was carried out by (Satumanatpan & Pollnac, 2017).

The income of fishermen is significantly impacted by technology. Our research's conclusions are consistent with those of other scholars (Leasiwal, 2017; Sakti & Dayanti, 2020), who discovered that technology significantly and profitably affects fishermen's earnings. This research, however, runs counter to that of (Amali, 2021), who discovered that technology had a negligible and negative effect on the income of fishermen in East Tanjung Regency.

Then the amount of time Seribu Islands fishermen spend will influence the amount of income they earn. This means that the intensity is greater with more time allocated and has a maximum positive impact on the low income of fishermen in the Seribu Islands. The results of this research are in line with research conducted by (Jeni et al., 2020) providing evidence that supports this, showing that working hours have a positive impact on fishermen's income. The average length of time at sea is 5 days per week or around 8 or 10 hours/day. The income generated by fishermen who spend 8 hours at sea/day is different from the income generated by fishermen who go to sea for up to 10 hours/day. Based on the research results obtained, it shows a significance level of $0.000 < 0.05$ with t -count of $4.118 > t$ -table of 1.985 . This means that the large amount of fishing time allocated has a positive influence on the income of fishermen in the Seribu Islands.

Sailing experience has no discernible effect on the income variable. The results of this study are supported by research by (Ahmad Ridha, 2017) and (Indara et al., 2017), which demonstrate that fishermen's experience level does not always affect their catches. Even respondents with limited fishing experience can catch a lot of fish if they have good skills and techniques. Two other studies (Aryanto & Sudarti, 2017; Putri & Wulandari, 2020) that discovered a positive and significant relationship between fishermen and work experience variables, on the other hand, disagree with the research findings.

CONCLUSION

As per the research findings, the Seribu Islands' fishing communities' income is largely influenced by two variables, capital and time at sea. Conversely, the fishing experience variable does not have a significant effect on the income of these communities. The revenue of local fishermen in the Seribu Islands was shown to be significantly impacted by the following elements, either independently or in combination: capital, fishing time, and past fishing experience. It is hoped that through this research, fishermen can increase their capital by extending their fishing time and traveling further to optimize their results. It is hoped that the Seribu Islands Government can contribute to policy-making and provide more attention to fishermen by providing support, guidance, and guidance on how to increase fishing. The government must also create policies that meet the needs of fishermen to optimize and augment their earnings, fishermen in the Seribu Islands require capital assistance from the government, which could take the form of financial resources or fishing gear.

Considering the conclusions reached, the following recommendations can be made regarding the findings of this study. It is believed that further research can add more factors that influence fishermen's income and become a reference source for other research. It is also planned for future researchers to examine variables such as catch, level of education, climate or season, and other factors that influence fishermen's income in addition to the variables that have been studied to provide more diverse results. Fishermen are expected to help create jobs and increase fishermen's income. Fishermen are required to be able to develop their fishing business sustainably. Seribu Islands fishermen are predicted to be able to increase their capital to maximize results by expanding their distance (fishing time) and utilizing technology. It is hoped that the Seribu Islands Regency Government can contribute to policy formulation and provide greater attention to fishermen by providing support, guidance, and guidance on how to increase fishing. Policies must also be adapted to the needs of fishermen. So that fishermen in the Seribu Islands can maximize and increase their income, the government must also provide capital assistance, both in the form of cash and fishing equipment.

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