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# THE INFLUENCE OF TIN MINING AT SEA TOWARDS REVENUE OF SMALL FISHERMEN IN BANGKA DISTRICT, BANGKA BELITUNG ISLAND PROVINCE
## (A Case Study of Rebo Village and Deniang Village)

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**Abstract**

This study aims to determine the differences in net revenue of small fishermen in Rebo Village that is affected and Deniang Village that is not affected by tin mining at sea in Bangka District and to determine the influence of the factors of working capital, fishermen's education, fishing experience, duration of fishing, and mining dummy on revenue net of small fishermen in Rebo Village and Deniang Village, Bangka District, Bangka Belitung Islands Province. The analytical tool used t-test: Two Sample Assuming Unequal Variances and multiple linear regression using a static test and classic assumption test. The results show that there is a very significant difference in average net revenue between small fishermen in Rebo Village and Deniang Village. The net revenue of small fishermen in Deniang Village without mining at sea is greater than Rebo Village with tin mining at sea. It can be seen that the net revenue of small fishermen per month in Rebo Village amounted to IDR 3,127,577, while the net revenue of small fishermen in Deniang Village is IDR 3,604,444. Calculation results show that the net revenue of small fishermen in Deniang Village is 8% greater than in Rebo Village. According to the test results, the t-count value of 3.85759 is greater than the t-critical of 1.99897 (two-tailed test) and 1.66980 (one-tailed test) or from a probability value of 0.00027 (two-tailed test) that is smaller than $\alpha$ = 0,05, so it can be concluded that there is a very significant difference. Then, the results of multiple linear regression show that working capital, fishermen's education, fishing experience, and duration of fishing have a positive and significant influence, but mining dummy has a negative and significant influence in Rebo Village and Deniang Village, Bangka District. It means that working capital, fishermen's education, fishing experience, and duration of fishing will increase the net revenue of small fishermen and vice versa, tin mining at sea will have a negative impact on small fishermen.

**Keywords:** Net revenue, small fishermen, working capital, fishermen's education, fishing experience, duration of fishing, and tin mining at sea.

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## A. INTRODUCTION

Indonesia is called a maritime country because it consists of islands and is divided into 34 provinces in Indonesia. Bangka Belitung Islands Province is one of eight Islands Province. Bangka Belitung Islands Province consists of a group of two islands namely Bangka Island and Belitung Island, which is surrounded by small islands. Bangka District with the Capital of Sungailiat has a water area of 1,377 $Km^2$. Bangka District consists of 8 Subdistricts and 77 Villages with territorial boundaries as follows: the north is bordered by the Natuna Sea, the south is bordered by Central Bangka District and Pangkalpinang City, and the west is bordered by West Bangka District. According to BPS data of 2019, the population of Bangka District was 337,337 thousand, the most compared to other regencies (Table 1).

**Tabel 1 Administrative Region Bangka Belitung Islands Province**

| No | District | Total Population ($Km^2$) | Sub-District | Village |
|---|---|---|---|---|
| 1 | Bangka | 337.337 | 8 | 77 |
| 2 | Bangka Barat | 213.163 | 6 | 63 |
| 3 | Bangka Tengah | 196.196 | 6 | 62 |
| 4 | Bangka Selatan | 209.973 | 8 | 53 |
| 5 | Belitung Timur | 129.572 | 7 | 39 |
| 6 | Belitung | 189.824 | 5 | 49 |
| 7 | Pangkalpinang | 212.727 | 7 | 42 |
| | Total | 1.488.792 | 47 | 385 |

Source : Data BPS Bangka Belitung Islands Province, 2019

Rebo Village is one of the villages on the coast of Bangka District, where tin mining activities at sea are carried out by state-owned companies or local communities. Tin mining activities at sea in Rebo Village has two methods, which are by the Production Suction Vessel (KIP) owned by the company of PT. Timah and its Partners and TI Apung conducted by the local community in the waters of the Rebo Village (Radar Bangka, 2019). The number of Production Suction Vessel (KIP) operating in Rebo Village is 3 units (Rakyatpos, 2019). The number of TI Apung operating in the waters of Rebo Village is dozens (Kupasmerdeka, 2019). In contrast, Deniang Village that is located on the coast of Bangka District is free of mining at sea because the local community in Deniang Village rejects all forms of tin mining activities at sea because many people in the region work as fishermen (Bangka.Tribunnews.com, 2019).

The potential of natural resources in the form of tin explored in the waters of Bangka Island is currently not able to adjoin with the fisheries and tourism sectors. The negative impact arising from tin mining at sea is very dangerous because the main impact is the direct disposal of *tailing* (mining waste) into the sea making seawater become turbid and the occurrence of

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sedimentation that can endanger the ecosystem in the sea. For example, ships operating on average have a *tailing* disposal capacity, for TI Apung is 20 m/hr, while the average tailing disposal capacity for Production Suction Vessel (KIP) is 250 m/h (Syari, 2016).

Regions in Indonesia that have tin ore content are mostly found in most areas of Bangka Belitung both in waters and on land, but this is inversely proportional to the people who depend on marine products. Fish catching production in Bangka District has decreased in the last two years. Based on data obtained in 2017, the amount of fish production in all districts in Bangka District was 27,761 tons, while in 2018, the production of fish fell to 26,017 tons, decreasing by 1,744 tons. Meanwhile, Belitung District is the district that has the largest sea catch production in the Bangka Belitung Islands Province (Tabel 2).

**Tabel 2. Volume (Ton) Fisheries Production by District in 2016-2018**

**Bangka Province** **Belitung Islands**

| No | District | Volume (Ton) | | |
|---|---|---|---|---|
| | | 2016 | 2017 | 2018 |
| 1 | Bangka | 10.575 | 27.761 | 26.017 |
| 2 | Belitung | 67.574 | 68.709 | 69.677 |
| 3 | Bangka Barat | 12.960 | 12.757 | 13.490 |
| 4 | Bangka Tengah | 22.988 | 24.128 | 24.616 |
| 5 | Bangka Selatan | 41.309 | 37.382 | 30.015 |
| 6 | Belitung Timur | 39.593 | 34.853 | 37.650 |
| 7 | Pangkalpinang | 10.575 | 2.941 | 3.480 |
| Bangka Belitung Islands | | 126.336 | 208.531 | 204.945 |

Source : Data BPS Bangka Belitung Islands Province, 2019

Mining is part or all stages of activities in research, management and exploitation of minerals or coal, which includes general investigations, exploration, feasibility studies, construction, mining, processing and refining, transportation and sales as well as post-mining activities (Law Number 4 of 2009). Tin mining at sea is a mining activity carried out on the seabed to extract tin. It is known by two mining methods of using Production Suction Vessel (KIP) and TI Apung (Adi, et. al 2012). Tin mining at sea is carried out by an official state-owned company known as PT. Timah and local communities. Therefore, it is known as legal and illegal mining.

Small fishermen on the coast of Bangka District still use fishing fleets or motorized vessels with a capacity of 5 GT that only normally catch fish around the coast with a maximum cruising distance of 6 miles at sea (Budianto et.al 2017). Small or traditional fishermen are types

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of small-scale fisheries (Lopes et.al 2011). Meanwhile, according to law No. 45 of 2009, small fishermen are people whose livelihood is fishing to meet the daily needs of life that use fishing vessels with the largest size of 5 (five) gross tons (GT).

Non-fish fishery commodity of squid in Bangka District waters, is a superior commodity caught by small fishermen because it has a softer meat texture and has a higher selling price compared to the prices of other types of squid (Febrianti et.al, 2016). This type of squid is known by the trade name "Cumi Bangka" ("Bangka Squid") (*Urotheutis chinensis*, Gray, 1849). The impact of tin mining activities at sea has caused the squid breeding to be disrupted. The quality of seawater around tin mining has a high Pb and Fe content. Therefore, it is categorized as poisonous to the body of the squid, which will ultimately affect the availability of squid in the sea (Febrianto, et.al 2015).

Tin mining activities in the waters of Bangka Island threaten small or traditional fishermen because their catches have dropped sharply and forced them to carry out further fishing activities given the relatively small capacity of the ship and limited logistical availability. For people who depend on tin for their lives, they claim that tin has provided welfare and can improve their living standards. Thus, many people who initially worked as fishermen and farmers switched professions to tin miners for the simple reason of getting higher and speedy revenue.

However, in reality, not everyone thinks the same. Many fishermen are still loyal to their profession, so they are not tempted by the results and revenue from the tin and are not willing if their livelihoods are ravaged by the presence of tin mining at sea. In fact, culture for coastal communities to survive is to earn a fortune from fishing activities at sea. The potential of natural resources in the form of tin in the sea is indeed large enough to contribute to the welfare of the community, but in its management, it does not harm other sectors. By noting the problem in this research background, it formulates the questions of whether there is a difference in net revenue earned by small fishermen between Rebo Village (with tin miners at sea) and Deniang Village, Bangka District and what factors influence the net revenue of the small fishermen.

## B. RESEARCH METHODOLOGY

This research was conducted in the coastal areas of Rebo Village and Deniang Village, Bangka District, Bangka Belitung Islands Province. The selection of locations is based on consideration of areas affected by tin mining at sea and areas without tin mining at sea.

The type of data according to the data source used is primary data. Data processing in this study uses Microsoft Excel and IBM SPSS 25 programs. There are two data collection techniques in this study, including interviews and questionnaires.

Net revenue is the difference between total revenue (TR) and total costs (TC). Therefore, Revenue = TR - TC. Total revenue (TR) is the multiplication of the production obtained (Y) with the selling price (Py). Costs are classified into two, including fixed costs and variable costs. Fixed costs (FC) are costs that are relatively fixed in number and continue to be incurred even if the production obtained is large or small. Variable costs (VC) are costs that the amount is

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influenced by the production obtained, for example costs for labor. Total cost (TC) is the sum of fixed costs (FC) and variable costs (VC), so that TC = FC + VC (Soekartawi, 2002). Working capital is the number of costs used during a certain period that is intended to generate short-term revenue (Current Revenue) in accordance with the main purpose of starting a business (Prakoso, 2013). Fishermen's education is the length of a person's education in their work that can be measured in the mastery of a worker. A person's education can be seen from the last level of education. (Ariska, 2019). Fishing experience is an experience of a person who has carried out his profession as a fisherman for a certain period of time measured by units of the year (Aryanto et.al., 2017). The duration of fishing is the number of hours of work performed by workers using monthly work hours (Lipsey in Kiranasari, 2010). Mining *dummy* is to test the area where there is tin mining and no tin mining in the sea.

**Analysis of Differences in Net Revenue of Fishermen**

To calculate the level of revenue of small fishermen, the following formula is used; TR = Q x P, in which, TR is total revenue, Q is the amount of fish caught (output) sold and P is the price of fish (price). Then, to calculate the cost of fishermen, then the following cost formula is used; TC = FC + VC, in which, TC is the total cost, FC is the fixed cost, VC is the variable cost. To calculate the revenue of small fishermen, the following revenue formula is used; Π = TR - TC, in which, Π is the net revenue (profit) obtained by the small fishermen (Soekartawi, 2002).

This analysis is used to test the average difference of one characteristic produced between two or more sample groups. This study uses the two free sample *t*-test in two tests. First, to test whether there is a difference in the average revenue of small fishermen in the area with tin mining at sea with the revenue of fishermen in the mining area and second to test the difference in average revenue of small fishermen in the area with tin mining at sea with the revenue of small fishermen in the area by tin mining at sea. The statistical test conducted was the *t*-test: Two Sample Assuming Unequal Variances using Microsoft Excel computer programs.

**Multiple Linear Regression Analysis**

To analyze the influence of independent variables (working capital, fishermen's education, fishing experience, duration of fishing, and mining *dummy* (1 with mining at sea, 0 without mining at sea) on the dependent variable (fishermen's revenue), ordinary linear regression model (ordinary least square) is used where the linear equation can be written as follows:

$$Y = b_0 + b_1X1, + b_2X2 + b_3X3 + b_4X4 + b_5dX5 + \varepsilon$$

In which,

| | | |
|---|---|---|
| Y | : | Fishermen's revenue (IDR/month) |
| $b_0$ | : | *Intercept* oe Constant |
| X1 | : | Working capital (IDR) |
| X2 | : | Fishermen's education (people) |

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| | | |
|---|---|---|
| X3 | : | Fishing experience (year) |
| X4 | : | Duration of fishing (hour) |
| $dX5$ | : | *Mining dummy* (1 with mining at sea, 0 without mining at sea) |
| ε | : | *eror (gallat)* |

Statistical testing is performed to determine the significance of the influence of partially and simultaneously independent variables on the dependent (Gujarati & Porter, 2012). This test consists of the *F*-Test and the *T*-Test, assuming the other independent variables are constant. By comparing the value of t-statistic probability, F-statistic and probability value of α = 5% or 0.05, so the criterion of this test is that Ho is rejected if the t-statistic probability value < α = 5%, which means that the variable can influence the dependent variable. Classical Assumption Test is tested using the Normality Test, Multicollinearity, Heteroscedasticity Test, and Auotocorrelation Test.

## C. RESULTS AND ANALYSIS

### Characteristics of Respondents

General description of the characteristics of the respondents of small fishermen in Rebo Village and Deniang Village, Bangka District is grouped based on net revenue, working capital, fishermen's education, fishing experience, and duration of fishing.

The net revenue of fishermen shows the distribution of respondents based on the net revenue of small fishermen in Rebo Village and Deniang Village in a month. The net revenue of fishermen in Rebo Village with the highest number of frequencies is IDR 3,500,000 - IDR 4,000,000 of 14 people with a percentage of 40%. Meanwhile, the distribution of respondents based on the lowest frequency of revenue of IDR 4,500,000 - IDR 5,000,000 of 1 person with a percentage of 3%. As for the dominant net revenue of small fishermen is IDR 3,500,000 - IDR 4,000,000. Furthermore, in Deniang Village, the net revenue of small fishermen with the highest number of frequencies is IDR 4,000,000 - IDR 4,500,000 of 13 people with a percentage of 43%. Meanwhile, the distribution of respondents based on the lowest frequency with revenue of IDR 2,000,000 - IDR 2,500,000 and IDR 2,500,000 - IDR 3,000,000, respectively 1 person with a percentage of 1%. As for the dominant net revenue of small fishermen is IDR 4,000,000 - IDR 4,500,000 (Table 3).

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**Tabel 3. Distributin of Respondents Based on Net Income of Small Fishermen in Rebo Village and Deniang Village**

| Nett Income (IDR) | Rebo Village | | Deniang Village | |
|---|---|---|---|---|
| | Frekuensi (n) | Presentase (%) | Frekuensi (n) | Presentase (%) |
| 2.000.000 – 2.500.000 | 4 | 12 % | 1 | 3 % |
| 2.500.000 – 3.000.000 | 11 | 31 % | 1 | 3 % |
| 3.500.000 – 4.000.000 | 14 | 40 % | 10 | 34 % |
| 4.000.000 – 4.500.000 | 5 | 14 % | 13 | 43 % |
| 4.500.000 – 5.000.000 | 1 | 3 % | 5 | 17 % |
| Total | 35 | 100 % | 30 | 100 % |

Source : Processed

Working capital for small fishermen shows the distribution of respondents based on working capital used by small fishermen in Rebo Village and Deniang Village within a month. In Rebo Village, the highest amount of total capital is IDR 2,500,000 - above of 19 people with a percentage of 54%. In Deniang Village, the highest amount of total capital of IDR 2,000,000 - IDR 2,500,000 of 26 people with a percentage of 88%. It can be seen that because the fishermen of Rebo Village must do further fishing because there is tin mining activity at the sea of their catching area, the burden of fuel oil needed increases. Meanwhile, fishermen from Deniang Village spend their capital as usual with fishing areas at sea that are not affected by the impact of tin mining at sea (Table 4).

**Tabel 4. Distributin of Respondents Based on Working Capital of Small Fishermen in Rebo Village and Deniang Village**

| Working Capital (IDR) | Rebo Village | | Deniang Village | |
|---|---|---|---|---|
| | Frekuensi (n) | Presentase (%) | Frekuensi (n) | Presentase (%) |
| 1.500.000 – 2.000.000 | 0 | 0 % | 2 | 6 % |
| 2.000.000 – 2.500.000 | 16 | 46 % | 26 | 88 % |
| 2.500.000 - above | 19 | 54 % | 2 | 6 % |
| Total | 35 | 100 % | 30 | 100 % |

Source : Processed

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The education level of small fishermen shows the distribution of respondents based on their level of education. The results show that in Rebo Village, most respondents who graduated from junior high school were 18 people with a percentage of 52%. Meanwhile, in Deniang Village, the most respondents who graduated from elementary school were 12 people with a percentage of 40%. It indicates that public awareness of education is very low. It is evidenced by the low education of fishermen due to the lack of available school facilities and the low interest of the community to take education. Besides, the fishermen are not interested in continuing higher education because it is caused by several things such as low interest to go to school, limited economic conditions, and socio-cultural conditions that consider as long as one can read and write, it is enough. This understanding still continues today (Table 5).

**Tabel 5. Distributin of Respondents Based on Education level of Small Fishermen in Rebo Village and Deniang Village**

| Education Level | Rebo Village | | Deniang Village | |
|---|---|---|---|---|
| | Frekuensi (n) | Presentase (%) | Frekuensi (n) | Presentase (%) |
| Not finish elementary school | 0 | 0 % | 0 | 0 % |
| Elementary School | 12 | 34 % | 12 | 40 % |
| Junior high school | 18 | 52 % | 10 | 33 % |
| Senior high school | 5 | 27 % | 8 | 27 5 |
| College | 0 | 0 % | 0 | 0 % |
| Total | 35 | 100 % | 30 | 100 % |

Source : Processed

The fishing experience of small fishermen shows the distribution of respondents based on fishing experience. The result is that the number of respondents who have the longest fishing experience as small fishermen in Rebo Village is 25-35 years of 18 respondents with a percentage of 56%. Meanwhile, the number of respondents who have the least fishing experience of 10-15 years is 3 people with a percentage of 10%. In Deniang Village, the longest fishing experience is 25 - 35 years of 19 respondents with a percentage of 63%. Meanwhile, the number of respondents who have the least fishing experience of 10-15 is 3 with a percentage of 10%. The fishing experience as a small fisherman by using a fishing gear is of a fishing line that aims to catch squid (Table 6).

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**Tabel 6. Distributin of Respondents Based on Fishing Experience of Small Fishermen in Rebo Village and Deniang Village**

| Experience | Rebo Village | | Deniang Village | |
|---|---|---|---|---|
| | Frekuensi (n) | Presentase (%) | Frekuensi (n) | Presentase (%) |
| 10 – 15 | 3 | 10 % | 3 | 10 % |
| 15 – 20 | 11 | 34 % | 8 | 27 % |
| 25 – 35 | 18 | 56 % | 19 | 63 % |
| Total | 35 | 100 % | 30 | 100 % |

Source : Processed

The fishing duration of small fishermen shows that the distribution of respondents in Rebo Village has the fishing duration with an interval of 9-10 hours with a total of 24 people with a percentage of 68%. While the smallest is 7 - 8 hours by 1 person with a percentage of 3%. Whereas Deniang Village has a fishing duration with an interval of 7-8 hours with a total of 11 people with a percentage of 37%. While the smallest is 9-10 hours of 9 people with a percentage of 30% (Table 7).

**Tabel 7. Distributin of Respondents Based on Fishing Duration of Small Fishermen in Rebo Village and Deniang Village**

| Fishing Duration | Rebo village | | Deniang Village | |
|---|---|---|---|---|
| | Frekuensi (n) | Presentase (%) | Frekuensi (n) | Presentase (%) |
| 7 – 8 | 1 | 3 % | 11 | 37 % |
| 8 – 9 | 10 | 29 % | 10 | 33 % |
| 9 – 10 | 24 | 68 % | 9 | 30 % |
| Total | 35 | 100 % | 30 | 100 % |

Source : Processed

**Results of Analysis of the Difference in Net Revenue of Small Fishermen in Rebo Village (with miners) and Deniang Village.**

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The revenue of small fishermen depends very much on the number of products produced and the price of the production. Production of small fishermen in Rebo Village and Deniang Village is calculated in kilograms.

**Tabel 8. Average Revenue of Small Fisherman in Rebo Village and Deniang Village**

| Variabel | Rebo Village | Deniang Village |
|---|---|---|
| Production (Kg) | 93 | 97 |
| Price per Kilogram (IDR) | 60.000 | 60.000 |
| Revenue (IDR) | 5.586.857 | 5.820.000 |

Source : Processed

Table 8 shows that the average total production of small fishermen in Rebo Village is 93 Kilograms, while the average total production for small fishermen in Deniang Village is 97 Kilograms per month. With the same price level at the collector level of IDR 60,000 per kilogram, it is known that the amount of monthly revenue for small fishermen in Rebo Village is IDR 5,586,857, while the revenue of small fishermen for Deniang Village is IDR 5,820,000 per month.

**Tabel 9. Cost Structure and Total Cost of Small Fisherman in Rebo Village and Deniang Village**

| Cost Structure | | Total Cost | |
|---|---|---|---|
| I | Fix Cost | Rebo Village | Deniang Village |
| | 1. Cost of depreciation (IDR) | 410.179 | 403.819 |
| | 2. Maintenance cost (IDR) | 295.000 | 225.000 |
| II | Variabel Cost | | |
| | 1. Fuel Cost (IDR) | 1.090.787 | 923.070 |
| | 2. Konsumsi & Es Balok cost (IDR) | 663.314 | 663.667 |
| Total Biaya (Rp) | | 2.459.280 | 2.215.556 |

Source : Processed

Table 9 shows that the fuel cost ranks first for fishermen in Rebo Village of IDR 1,090,787. Meanwhile, for the fishermen in Deniang Village is IDR 923,070. The second highest cost for small fishermen in Rebo Village is the cost of consumption and ice blocks of IDR 663,314. Meanwhile, for small fishermen in Deniang Village, the second highest cost component is consumption and ice blocks of IDR 663,667. The third highest cost for small fishermen in Rebo Village is the depreciation costs of IDR 410,179. While for small fishermen in Deniang Village, the third largest cost component is depreciation costs of IDR 403,819. The fourth

highest cost for small fishermen in Rebo Village is maintenance costs of IDR 295,000. While for small fishermen in Deniang Village, the third highest cost component is depreciation costs of IDR 225,000.

Based on the results of the calculation of the level of revenue of small fishermen (table 10) and the costs incurred in a month (table 10), then the net revenue level of fishermen in one month can be calculated as follows;

**Tabel 10. Recapitulation of Calculation of Average Income of Small Fisherman in Rebo Village and Deniang Village**

| Variabel | Rebo Village | Deniang Village |
|---|---|---|
| Production (Kg) | 93 | 97 |
| Price per kilogram (IDR) | 60.000 | 60.000 |
| Revenue (IDR) | 5.586.857 | 5.820.000 |
| Total Cost (IDR) | 2.459.280 | 2.215.556 |
| Nett Income (IDR) | 3.127.577 | 3.604.444 |

Source : Processed

Table 10 shows that the monthly net revenue of fishermen in Rebo Village is IDR 3,127,577, while the net revenue of fishermen in Deniang Village is IDR 3,604,444. The calculation results show the net revenue of the small fishermen of Deniang Village is higher than the Rebo Village that is equal to 8%. To find out whether there is a difference in the net revenue of small fishermen in the mining area and that in the area without mining, a two-difference test was used. The statistical test conducted was the t-test: Two Sample Assuming Unequal Variances using Microsoft Excel computer programs. The average difference test results are presented in the following table;

**Tabel 11. Results t-test: Two Sample Assuming Unequal Variances**

| t-count | Two side-test | | One side-test | |
|---|---|---|---|---|
| | t-critical | Probabilitas | t-critical | Probabilitas |
| 3.85759 | 1.99897 | 0.00027 | 1.66980 | 0.00013 |

Source : Processed

In accordance with the test results in table 11, it can be seen that the value of t-count of 3.85759 is greater than the t-critical of 1.99897 (two-sided test) and 1.66980 (one-sided test) or from the probability value of 0.00027 (two-sided test) which is smaller than $\alpha = 0.05$, then, $H_0$ is rejected and $H_1$ is accepted. It means that there is a very significant difference in net revenue between small fishermen in Rebo and Deniang villages. It can be said that the net revenue of

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small fishermen in Deniang Village without mining activity is greater than in Rebo Village with tin mining activity at sea.

**Results of Multiple Linear Regression Analysis**

The influence of working capital, fishermen's education, fishing experience, duration of fishing, and mining *dummy* on the net revenue of small fishermen in Rebo Village and Deniang Village Bangka District.

Analysis of working capital, fishermen's education, fishing experience, duration of fishing, and mining *dummy* on the net revenue of small fishermen in Rebo Village and Deniang Village in Bangka District in classic assumption test did not show multicollinearity and heteroscedasticity.

The calculation of the accuracy of the model from adjusted $R^2$ shows that the independent variable in the net revenue model of small fishermen in Rebo Village and Deniang Village presented can explain each of the percentages of the contribution of independent variables (working capital, fishermen's education, fishing experience, duration of fishing, and mining *dummy*) of 57,7% of the variation (ups and downs) of the dependent variable. Meanwhile, the other 42.13% each was contributed by other factors not included in the model (Tabel 12).

**Tabel 12. Adjusted $R^2$**

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .781[a] | .610 | .577 | 357175.816 |

Source : Processed

The F-test results show the net revenue of small fishermen from the outputs in (table 13). The calculated F value of 18,448 with a significant level of 0,000 because a significant level of 0,000 $<\alpha = 0.05$. Therefore, there is a simultaneous influence of working capital, fishermen's education, fishing experience, duration of fishing, and mining *dummy* to net revenue of small fishermen. It shows that the five independent variables simultaneously or jointly have a significant influence on the dependent variable.

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**Tabel 13 F-Test Result**

**ANOVAa**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 11767 | 5 | 23534 | 18.448 | .000[b] |
| | Residual | 75268 | 60 | 12757 | | |
| | Total | 19294 | 65 | | | |

Source : Processed

**Tabel 14. Results of Multiple Linear Regression Analysis**

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 369916.634 | 481083.270 | | .769 | .445 |
| | Workingcapital | .410 | .184 | .205 | 2.220 | .030 |
| | Education | 103619.495 | 24684.163 | .374 | 4.198 | .000 |
| | Experience | 52520.607 | 10714.298 | .415 | 4.902 | .000 |
| | Duration Fishing | 1667.130 | 719.527 | .233 | 2.317 | .024 |
| | Minning Dummy | -588504.907 | 113541.165 | -.538 | -5.183 | .000 |

Source : Processed

The working capital variable has a positive and significant influence on the net revenue of small fishermen in Rebo Village and Deniang in Bangka District. The regression coefficient on the working capital variable is 0.410, which means that if working capital rises by 1%, then the net revenue of small fishermen will also increase by 0.410% with significant value on working capital of 0.030 > 0.05. It can be concluded that working capital has a significant and positive influence on fishermen's revenue. The working capital variable has a value of a t-count of 2.220 with a t-table of 1.668. Because t-count > t-table, it can be concluded that the working capital variable has a positive influence on the net revenue of small fishermen in Rebo and Deniang Villages. This finding is in line with Gosyen's research (2015) which explained that working capital has a positive and significant influence on the net revenue of fishermen and in line with the statement by Mubyarto that capital has a very strong relationship with the success or failure of a production business established (Tabel 14).

Fishermen's education variable has a positive and significant influence on the net revenue of small fishermen in Rebo Village and Deniang, Bangka District. The regression coefficient value of the fishermen's education variable of 103619 is positive. It means that if education rises

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by 1%, then the net revenue of small fishermen will also increase by IDR 103619 with a significant value of education of 0,000 > 0.05. It can be concluded that education has a positive and significant influence on the net revenue of small fishermen. The education variable has a value t-count of 4,198 with a t-table of 1,668. Because t-count > t-table, it can be concluded that the education variable has a positive influence on the net revenue of small fishermen. This finding is in line with Ariska's research (2018) in the Kenjeran Coast Region of Surabaya in 2018 and Adili et al. (2017) in Tanzania in the Indian Ocean that education has a positive and significant influence on fishermen's revenue (Tabel 14).

The fishing experience variable has a positive and significant influence on the net revenue of small fishermen in Rebo Village and Deniang, Bangka District. The value of the regression coefficient on the fishing experience variable of 52520 is positive. It means that if the experience of fishing rises by 1%, then the net revenue of small fishermen will also increase by IDR 52520 with significant value on the experience of fishing at 0,000 > 0.05. It can be concluded that the fishing experience variable has a significant and positive influence on the net revenue of small fishermen. The fishing experience variable has a t-count of 4,902 with a t-table of 1,668. Because t-count > t-table, it can be concluded that the fishing experience variable has a positive influence on the net revenue of small fishermen. This finding is in line with research by Chowndbury (2014) and Aryanto et al. (2018) which stated that one's work experience will have a positive and significant influence on the revenue received. The longer the working experience, the more revenue will be received (Tabel 14).

The duration of fishing variable has a positive and significant influence on the net revenue of small fishermen in Rebo Village and Deniang Village, Bangka District. The value of the regression coefficient on the duration of fishing variable of 1667 is positive. It means that if the duration of fishing rises by 1%, the net revenue of small fishermen will also increase by IDR 1667 with significant value on the duration of fishing of 0.020 > 0.05. It can be concluded that the duration of fishing variable has a significant influence on the net revenue of small fishermen. The duration of fishing variable has a t-count of 2,317 with a t-table of 1,668. Because t-count > t-table, it can be concluded that the duration of fishing variable has a positive influence on the net revenue of small fishermen. This finding is in line with Rahim's research (2018) that the duration of fishing has a positive and significant influence on the revenue of fishermen, indicating that every additional 1 hour of work will influence the revenue of fishermen (Tabel 14).

The mining *dummy* variable has a negative and significant influence on the net revenue of small fishermen in Rebo Village and Deniang Village, Bangka District. The regression coefficient value of the mining *dummy* of -588504 is negative. It means that the influence of mining on the net revenue of small fishermen will also decrease by IDR 588504 with significant value on mining *dummy* of 0,000 > 0.05. It can be concluded that the mining *dummy* variable has a significant influence on the net revenue of small fishermen. The mining *dummy* variable has a t-count of -5.1883 with a t-table of 1.668. Because t-count < t-table, it can be concluded that the mining *dummy* variable has a negative and significant influence on the net revenue of small fishermen. This is because the operational costs of fuel in the area with mining increases due to the distance traveled for fishermen above 5 mills to avoid tin mining activities at sea. This

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finding is in line with the research of Shari (2016), Justicea (2014), Ibrahim (2015), Febrianto (2014) and Kurniawan (2013) that tin mining in the sea has a negative impact on the environment, seawater quality, fishing area of small fishermen, damage to coral reefs, and other marine biotas (Tabel 14).

## D. CONCLUSIONS AND SUGGESTIONS

### Conclusions

1. Based on the research findings, it is found that there are very significant differences in average net revenue between small fishermen in Rebo and Deniang Villages. It can be said that the net revenue of small fishermen in Deniang Village without mining activity is greater than in Rebo Village with tin mining activity at sea which is indicated that the net revenue per month of Rebo Village fishermen is IDR 3,127,577, while net revenue of Deniang Village is IDR 3,604,444. The calculation results show that the net revenue of the small fishermen of Deniang Village is greater than the Rebo Village that is equal to 8%.
2. Based on the findings of research that has been done, the working capital variables, fishermen's education, fishing experience, and duration of fishing have a positive and significant influence, but for mining *dummy* has a negative and significant influence.

### Suggestions

1. Regional governments must clearly regulate fishing areas and tin mining exploration areas to avoid harmful problems, especially for small fishermen in areas affected by tin mining at sea.
2. Operational costs and a small fishing fleet become a burden for small fishermen for areas affected by tin mining at sea. Therefore, the local and the central government should set the exploration area to be above 6 mills from the coastline.

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