



Article

Analysing Monetary Factors that Influence the Coastal Fisherman Income during COVID-19 Pandemic in West Aceh Regency, Indonesia

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Abstract: This study analyses the fisherman's income through monetary factors during the COVID-19 pandemic in coastal areas of West Aceh Regency in Aceh Province, Indonesia. This study applied cross-section data over 2021 using descriptive quantitative research and OLS model analysis (Ordinary Least Square). Research revealed monetary factors in terms of the inflation of groceries price negatively influenced the fisherman income at West Aceh Regency. Meanwhile, the diesel price variable positively influenced fisherman's income. During the COVID-19 pandemic, there was an increase in groceries price (inflation) by 1,06 times or the consumer price index (CPI) of groceries price at 106 percent. However, diesel prices were still the same as before the COVID-19 pandemic because fishermen used subsidised fuel at IDR 5.150 per litre. However, the quota of subsidised diesel did not fulfil the fisherman needs, so they must buy non-subsidised diesel. It impacted the operational fishing cost, which was bigger than the fisherman's income. Moreover, during the COVID-19 pandemic, the average fisherman's income decreased to IDR 1.500.000-IDR 3.000.000 each trip compared with before the COVID-19 pandemic at IDR 5.000.000- IDR 7.000.000 each trip. It was caused by low fish prices caused by the decreasing fish demand.

Keywords: fishermen income; food material; inflation; price of fuel; coastal fishing.



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1. Introduction

Coronavirus Disease 2019 (COVID-19) is a respiratory tract disease first detected in Wuhan, China, in 2019, which finally spread worldwide, becoming a global pandemic (Chakraborty & Maity, 2020). The COVID-19 outbreak caused a world economic recession, including in Indonesia (Olivia et al., 2020). COVID-19 Outbreak spread to Indonesia at the beginning of March 2020 through Indonesia government information and based on data obtained from the Health Ministry of the Republic of Indonesia on November 2021 that the number of COVID-19 cases reached 522.581 people in all of Indonesia area. In order to prevent the spread of COVID-19, the Indonesian government released the policy of physical distancing and social distancing, working from home and large-scale social restrictions (Purnama & Susanna,

2020), which was written in the regulation of Indonesia government No. 21, 2020. As a result, it impacted all economic sectors, including fishery sectors, such as fishermen who stayed in Indonesia’s coastal areas and communities who depend on fishery sources. They perceived that that policy bothered local fishermen and the fishery industry in marketing their catch.

Then, the fisherman’s catch result decreased the quality or even became rotten fish. Moreover, several cold storages had overstock because the fish could not be sold to the other regions like usual. It affected a significant decrease in fish prices by 50 %. It was not comparable with the effort and operational cost used for fishing. As a result, fisherman’s economic condition was getting worse (Kholis et al., 2020). It also happened to the fisherman in West Aceh regency, which is the West coastal area of Aceh province. According to the statistical centre (2020), the sea area of west Aceh regency is 12 mil, equalling 957,38 km², so it has big potential in fishery sector. As a result, the number of West Aceh fishermen is bigger than the other regency in west south coastal area of Aceh province, Indonesia. It is known that the Aceh Jaya regency has 1.010 fisherman, the West Aceh regency has 3.500 fishermen and South west Aceh regency has 2.919 fisherman. Even though there are big sources for the fishery sector, the fisherman income was unable to fulfil life needs, so the fisherman life in coastal area was not yet prosperous.

Moreover, during COVID-19 pandemic, new problem rise in West Aceh regency such as fish price fell which caused the decrease of fisherman income. The closing of several areas caused fish supply chain to disturb in this condition several coastal areas which did not have cold storage will waste the fish or sold it with low price to an agent. This condition was very detrimental to fishermen because fish export from Aceh to the other areas stopped which was derived from low demand from Medan. The export market decreased fisherman activities because operational fishing cost used for buying fuel was not balanced with fisherman income, and that was monetary factor. The operational cost paid by fisherman was cash out and non-cash expenditures. Example of cash out was cost of fuel, oil, preservatives (ice and salt), crew consumption, retribution and taxes. Meanwhile, non-cash expenditures were the ship crew wages, generally paid after sale (Sapanli et al., 2020).

The main problem of the fisherman income phenomenon was monetary factors compared with social, economic and natural phenomena. Therefore, these phenomena were very interesting to be studied. Monetary factors such as groceries price will be studied, which will be reflected in the consumer price index and the fuel used for fishing activity during the COVID-19 pandemic. That monetary factor can influence fisherman’s income because groceries price are portrayed on the consumer price index, and fuel prices which was fishing production costs for the fisherman who used motor vessels. If the price of groceries and fuel increase, it will affect fisherman’s income because if they do not go fishing, there will be no income. Monetary factors can be reviewed from groceries price, which was reflected on the average price of goods and services consumed by the community (household) in one price index called consumer price index (CPI) and the increasing percentage of CPI named inflation.

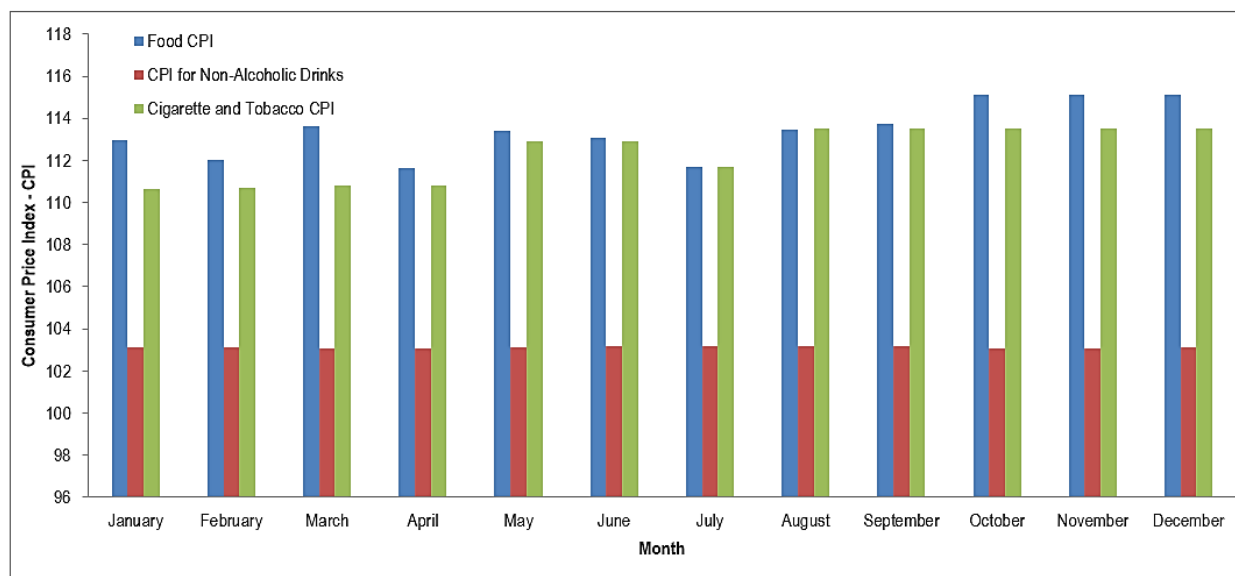


Figure 1. Development of CPI for the Food, Beverage and Tobacco in Meulaboh City for 2020.

Source: BPS West Aceh Regency (2021)

CPI is calculated every month to discover the goods price change in general, whether it is increasing or not, and based on that information, the inflation percentage can be known, whether it is high or low. Moreover, the kinds of goods and services can be grouped into seven groups according to the Individual Consumption by Purpose (COICOP)

classification. The first group is food materials, including grains such as rice, tubers, meat, fresh fish, egg, milk, vegetables, nuts, fruits, seasonings, and cooking oil. The second group was ready-consumed food, non-alcohol beverages, cigarettes, and tobacco. The third group was housing, electricity, gas, and fuels. The fourth group was the clothing group. Fifth group was health such as medicines, physical treatment service. Next group was education, recreation and sport. The last group was transportation, communication and finance (Natsir, 2014). However, this research only discovers inflation from the food price change seen from CPI. To see the development of CPI to food material, beverage, and tobacco group Meulaboh city in 2020 from January until December can be seen in the following Figure 1.

Figure 1 related to CPI food, beverage, and tobacco group that inflation happens in food tobacco group, cigarette and tobacco group. Meanwhile, non-alcohol had deflation. As a result, it needs to analyse whether inflation happens in food groups such as rice, egg, cooking oil and other food goods. The cigarette and tobacco group will impact fisher income in the coastal area of West Aceh Regency, where inflation in Aceh's west-south coastal area used Meulaboh inflation guidelines. Besides, the food material, which influenced the fisher's income, is fuel oil. Fuel oil utilised by motorboats is diesel fuel, the main capital for the fisherman to go fishing. The fuel prices, which often fluctuate, make fisher difficult to predict the fishing production cost. Even though the government gives fishery fuel subsidies, the quota is insufficient. The diesel price is IDR 5.150 per litre from January until December 2020. However, the development of non-subsidy diesel prices in 2020 can be seen in the following Table 1:

Table 1. Adjustment of Selling Prices for Types of Gasoline and Diesel Channeling through Fishermen's Fuel Filling Stations in January-September 2020.

Types of gasoline/ diesel fuel	Before Price Adjustment (IDR) per Liter	After Price Adjustment (IDR) per Liter
Pertamax	9.850	9.200
Pertamax Turbo	11.200	9.990
Pertamina Dex	11.700	10.200
Dexlite	10.200	9.500
Diesel Non-Subsidy	9.600	9.300

Table 1 displays the price of non-subsidy fuel and non-subsidy diesel, which have been adjusted on price by Pertamina Company in all of Indonesia area since January 5th, 2020, in implementation of Ministry Decision ESDM 187K/10/MEM/2019, including Aceh province. Before this adjustment, the price of fuel and diesel in some areas was not the same because the amount difference of tax fuel influenced it. After the fuel price adjustment, the price is decreased, so it needs to analyse through this research whether the price change of fuel and diesel affects the increase of fisher income in the coastal area of West Aceh Regency.

2. Literature Review

Fisher is someone who works by catching the fish. Then, Apridar & Karim (2011) differentiated fisher by the following:

1. Fisher based on the fishing tools
 - a. Fisher with properties means fisher who has fishing tool whether directly catch the fish or lease his fishing tools to others.
 - b. Fisher as worker means fisher who does not have fishing tool, but they rent it from other or they work to someone who has fishing tools.
2. Fisher based on work time
 - a. Full time fisher is fisher, who has fishing tool or not, only works in fishery sector without any other job.
 - b. Part time fisher means fisher, who has fishing tool or as worker, has another job.
3. Fisher based on position
 - a. The boss of fisher is fisher who has fishing tool i.e. boat and net
 - b. Worker means fisher who operates fishing tool, which is not his property, or fisher who only has simple fishing tool. Usually, this worker has low education effected on the unknown of market price so that they are stuck in poverty.
4. Fisher based on the using of fishing technology
 - a. Traditional fisher is fisher who utilises rowing boat, motorboat with the biggest size 5 gross tonnages (GT) and using trawl, fishing line, ganyang, rempa, cawo and sungkur as fishing tools.
 - b. Semi modern fisher is fisher who still uses traditional machine tool in catching the fish with boat size above 5-8 GT.

- c. Modern fisher means fisher who uses motorboat with fishing technology i.e. 100 PK machine with 5-10 GT until 200 GT capacity.

2.1. Fisher Income

Fishermen’s income is the difference between revenue and fishing costs spent per trip or year (Salas et al., 2004). In other words, fishermen’s income is all the income received by fishermen’s households from fishing in the sea after conducting sale and purchase transactions between fishermen as producers and buyers as consumers and transactions between fishermen (producers) and fish dealers (distributors) (Lasut et al., 2019). In general, offshore fishing that is carried out for a longer time and is further from the target area of the fish catchment has a higher probability of obtaining a higher catch (production) and provides a higher income than near-shore fishing (Dahen, 2016).

2.2. Monetary Phenomena

Monetary phenomena based on monetarists thought inflation could be stated as a monetary phenomenon because inflation is caused by money supply growth. As a result, there was a price change, but the output was constant. Meanwhile, structuralists explained that inflation was a long-term monetary phenomenon that emphasised strict economic structure, especially in developed countries (Hervino, 2011).

2.3. Inflation Theory

Inflation is the price-increasing process of things continuously. It does not mean the price of various tools is increasing by the same percentage. Even though a high enough percentage is not inflation, increasing happens at one time. The price increase is measured with a price index. Some price index is often used to measure inflation, including the consumer price index, wholesale price index and Gross National Product (GNP) deflator (Silalahi, 2014).

2.4. The Price of Fuel Oil

The price of fuel oil is some monetary value, which determines to get one oil barrel. The increase of oil price effect the fishery and decreases the produced output. It happens because the price increase of fuel oil makes the production cost increase (Cleveland, 1991). There is some effect of fuel oil price increases on fisher, such as price increasing of fuel oil will decrease the number of produced fish so that the price of fish at market will increase. The price increasing of fuel oil is clearly affected on many people. For example, with price increasing on premium or solar as fisher transportation fuel cause the increasing of production cost. The increasing of production cost will push the sell price of output (Sabar & Indasari, 2018).

2.5. Hypothesis

The hypothesis tested in this study is that it is assumed that the monetary phenomenon of inflation of foodstuff prices and diesel fuel prices correlates with the income of fishermen in coastal areas in West Aceh Regency.

3. Materials and Methods

3.1. Population and Sample

The population in this study were all fishermen who use motorboats in West Aceh Regency located in Johan Pahlawan District, Bubon District, and Meurebo District as many as 1.784. Furthermore, the number of samples was 89 respondents, with 5 percent of the total population to obtain a sample size that was not too large. This study focuses on Johan Pahlawan Subdistrict, Sama Tiga Subdistrict, Meurebo Subdistrict in West Aceh Regency. Those areas were chosen with consideration that the three are located in Coastal Areas. This research on 2021 uses descriptive quantitative approach and cross-section data (Sugiyono, 2017). The sampling technique uses incidental sampling, namely motorboat fishermen who are met by chance to meet the researcher can be sampled if the person is suitable as the data source. (Sugiyono, 2017) which can be seen in Table 2.

Table 2. The number of Populations and Samples in Coastal Areas in West Aceh Regency for 2021.

No.	Districts	Population	Sample 5% of Population
1.	Johan Pahlawan	887	44
2.	Samatiga	456	23
3.	Meurebo	441	22
	Total	1.784	89

Source: BPS West Aceh Regency (2021)

3.2. Data Analysis

The data analysis model used double linear regression through OLS (Ordinary Least Square) with the following formulation of the equation model:

$$PNP = a + b \text{ FMIHBM} + c \text{ FMHBBM} + e \tag{1}$$

Then, to make data tabulation easy because the variable unit of food price inflation, fuel price, and income are different so equation model (3.1) is transformed into natural logarithm model (Ln), which can be written as follow:

$$\text{LnPNP} = a + b \text{ FMIHBM} + c \text{ LnFMHBBM} + e \tag{2}$$

PNP = Fisher Income, FMIHBM = Monetary Factors (the inflation of food material price), FMHBBM = Monetary Factors (Fuel Price), a = Constant, b = regression coefficient of food material price, c = regression coefficient of fuel price and e = Error term.

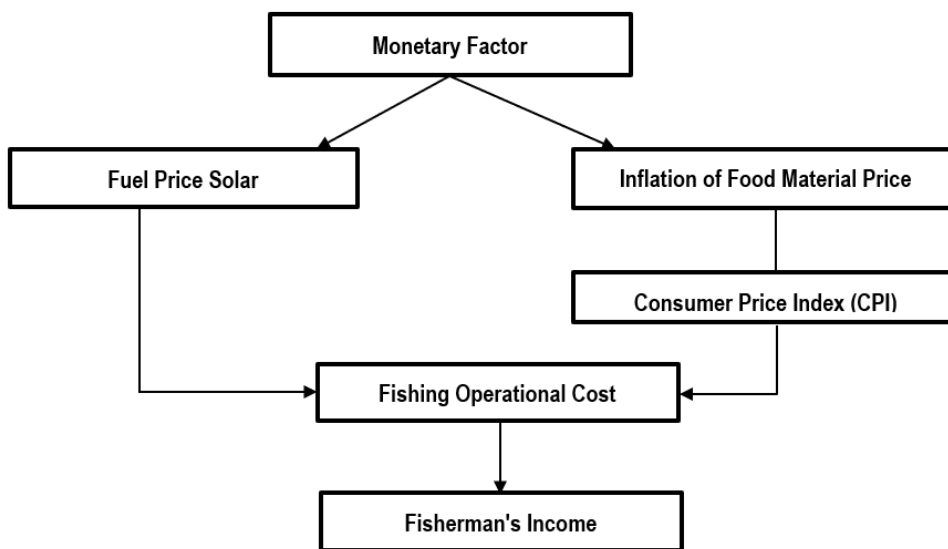


Figure 2. Research Framework.

4. Results and Discussion

Although natural resources for capture fisheries in Aceh Barat Regency are abundant, as seen from fish production, coastal communities who live as fishermen have low incomes, even below the minimum wage. It can be seen in Figure 3:

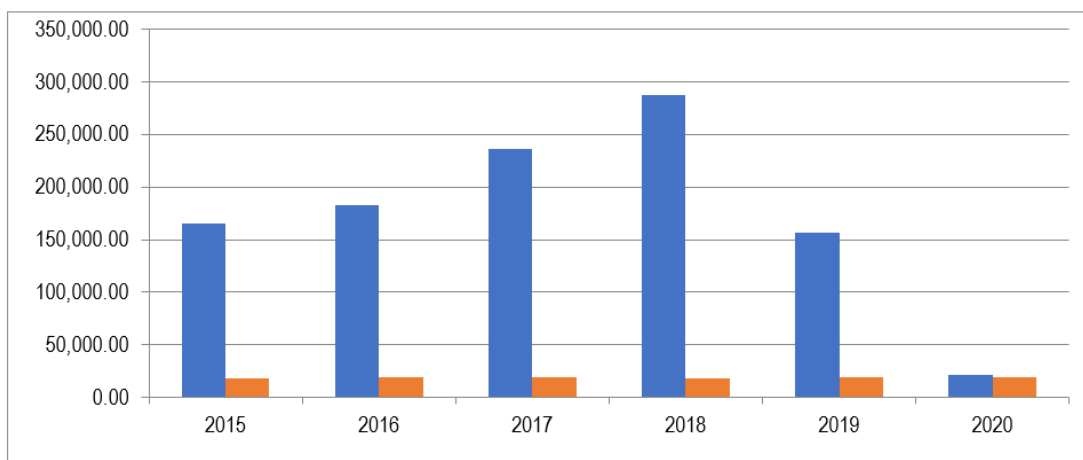


Figure 3. Fish Production in West Aceh Regency

The portrait of fisherman life in coastal areas of West Aceh Regency is small-scale fishermen capitalising on labour and simple fishing tools, having low education degrees, and having minimum market information. The roles of skippers were big in their social and economic life, both in production and marketing or even in fulfilling daily needs. As a result, it was known that fisherman life was still far from prosperity. During the COVID-19 pandemic, fishermen’s life in West Aceh Regency was worst because the fishermen’s income was lower, causing low fish prices compared with before the COVID-19 pandemic. The comparison of fish prices before and during pandemic can be seen in Table 3.

Table 3. Comparison of Fish Prices before and during COVID-19 Pandemic in West Aceh Regency

No.	Types of Fish	Fish Price (IDR) /Kg	
		Before COVID-19	COVID-19
1.	Red snapper (<i>Lutjanus campechanus</i>)	60.000	30.000
2.	Mackerel (<i>Scomber scombrus</i>)	15.000	7.000
3.	Anchovy (<i>Stolephorus commersonii</i>)	8.000	3.000
4.	Tuna fish (<i>Thunnus</i>)	55.000	22.000
5.	Cob fish (<i>Euthynnus sp</i>)	15.000	4.000
6.	Dencis (<i>Sardinella melanostica</i>)	25.000	9.000
7.	Kingfisher (<i>Alepes melanoptera</i>)	5.000	3.000
8.	Pike (<i>Scomberomorus guttatus</i>)	10.000	6.000

Table 3 shows types of fish that are often caught by fishermen in the coastal areas of West Aceh Regency are ikan kakap merah, ikan kembung, ikan tuna, ikan tongkol, ikan dencis, ikan dodok dan ikan kacang. The price of fish during the COVID-19 pandemic decreased by an average of 50 percent compared to before the COVID-19 pandemic. During the COVID-19 pandemic, fisherman fishing result in West Aceh regency was the same as before COVID-19 or even more. However, fish demand decreased both from consumers and restaurants and the fish processing industry. As a result, fish could not collect, and much rotten fish was wasted on the riverside. This condition caused fisherman income to decrease in West Aceh Regency. Based on the finding collected by interviewing 89 respondents, it was revealed that the monetary phenomena occurred by the fishermen in West Aceh regency located in Johan Pahlawan district, Samatiga, and Meureubo during the COVID-19 pandemic was the same. If it was reviewed from inflation (CPI), it revealed there was increasing in groceries price (rice, sugar, cooking oil, egg and cigarette) at 106 percent or 1,06 times in 2020 compared with 2019, and it means the inflation of groceries prices before COVID-19 pandemic was 100%.

Meanwhile, the price of fuels and the limitation of fuel stock for fishermen at the refuelling station for fishermen was 5 tons each day. The amount of diesel stock was unable to fulfil the needs of the motor vessel in West Aceh regency. It impacted the fisherman’s income, especially small-scale fishermen because they go fishing every day and back on the same day using 3-5 GT (gross tonnage) motor vessels. Small-scale fisherman only gets 500-litre diesel or half a ton each day and will not get more diesel tomorrow, so they have to buy diesel from a big fisherman with high fishing prices the next day. Monetary phenomena were burdensome for fishermen during the COVID-19 pandemic because fish prices were low. Hence, fisherman’s income decreased, impacting their inability to pay the debt lent as fishing capital to buy groceries and diesel fuel. The number of diesel fuel needed by motor vessel fisherman depend on the kind of motor vessel and fishing distance, which can be seen in the following Figure 4:

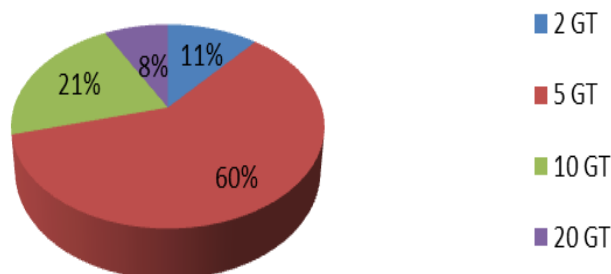


Figure 4. Type of Fisherman Motor Vessel

Figure 4 indicates that most fishermen in west Aceh regency’s coastal areas were small-scale fishermen (60 percent) using 5 GT motor vessels, wherein they go fishing daily. Even during the COVID-19 pandemic, a small-scale fisherman was still fishing because they would not get the income if they did not go fishing. The income earned by fishing fishermen in 2021 is an average of 1,000,000 – 5,000,000 IDR/trip, of which 64% is a traditional fisherman. This income will still be a gross income that operational costs and wages of crew members have not deducted. Meanwhile,

21.74% are semi-modern fishermen with an income of IDR 6,000,000 - IDR 11,000,000/trip. The income of these capture fishermen is starting to stabilise compared to 2020. The income of fishermen is 1,500,000- 3,000,000 IDR/trip. It is because, in 2020, the onset of the COVID-19 pandemic and 2021, the status of the pandemic is heading to new normal, whereas in normal times before the COVID-19 pandemic, the average income of fishermen reached IDR 5,000,000-IDR 7,000,000/trip. It can be seen in the following Figure 5:



Figure 5. Fishermen Income

Then, to discover the impact and correlation of monetary factors (inflation of groceries price) and the fuel price to fisherman income can be seen in the following Table 4.

Table 4. Result of Regression Estimation

Variable(s)	Coefficient	t-stat	Sig.	α	F - stat	Sig
Food Price Inflation	-0.039	-0.689	0.581	0.05 (5%)	13.875	0,000
Prices for Diesel Fuel	0.851	5.114	0.001			
R2				0.755		
Adjusted R2				0.701		

Table 4 describes that the partial test (T-test) for the inflation variable of food material price is obtained T value = -0,689, which is bigger than t table = - 1,833. So, it can be concluded that the inflation of food material prices negatively influences fisher income using motorboats in West Aceh Regency. Still, it was not significant on level 5 %. It is caused during the COVID-19 pandemic. The increasing food material price caused physical and social distancing. It influenced the operational fishing cost. The fisher, such as the price of fuel, ice, salt, and food supply, paid production costs. When the price increases in the food supply, the fisher will decrease the number of foods buying such as; rice, instant noodle, sugar, coffee, and cigarette. However, they prioritise buying sugar, coffee, and cigarettes because they can tolerate hunger and reduce fishing time, i.e. 15-20 days before the pandemic becomes 3-5 days, so that it is influenced to fisher income. Unfortunately, the number of fish was almost the same as the day before the pandemic, 300-500 tons, because they recognised the fish location, which has many fish, and the number of fish obtained depended on west and east wind season. Because the price of fish decreases, the fisher income decreases, i.e. IDR 1.500.000-IDR 3.000.000 rather than their income before the COVID-19 pandemic reached IDR 5.000.000-IDR7000.000. However, fisher income is net income accepted after reducing production costs. Nevertheless, fisher income is divided between motorboat owners, ship crew, and sea guards. The pattern of sharing profit accepted by the ship crew and the owner is half, and the profit obtained by the ship crew should be divided with the other worker.

Meanwhile, the variable of diesel price had a positive influence on motorboat fishing. It is significant on level 5 percent, which showed by the value of t count (5,114) bigger than the value of t table (1,833), and it was not significant because the significance is bigger (0,001) smaller than significance level 0,05 percent. It can be explained that the diesel used by motorboats is subsidised diesel. So that if the price of diesel increases, still go to fishing. It will become a barrier for fishers. as a result, to save diesel fishers join with other fishers to use one motorboat. Fish resulted was much, but the price of fish was low, so they sold half of them to fish procession entrepreneurs as salted fish, kemamah paid with normal price because salted fish and kemamah were souvenirs from West Aceh Regency. Based on the simultaneous variable test, the food supply inflation and diesel variable are influenced by the income of motor boat income in West Aceh Regency.

5. Conclusions

This study concludes that food material inflation negatively influenced fisher income using motorboats, but it was insignificant. Meanwhile, the price of diesel positively influenced fisher income and was significant. The fisher income during the COVID-19 pandemic decreased because the fish price was low, even though the number of fish caught depended on the wind season. Meanwhile, most fish are Teri, shrimp, lobster, kapas-kapas, and tuna in the east wind season. The mean fisher income during the COVID-19 pandemic is IDR 1.500.000-IDR 3.000.000 per trip. Those low incomes make fishers stuck in poverty because the income obtained can be saved, but they spend it for family consumption and paying the loan. This study suggests that Aceh Government should give cash incentives to help small-scale fishers so that they do not have a loan from a creditor. Giving incentives should be given to the right people to return to the economy in a new normal era. The government of West Aceh Regency should try to provide subsidised fuel stations for fishers in every sub-district in the coastal area of West Aceh Regency so that the fisher can easily access the fuel to go fishing. Marine and Fishery service at West Aceh Regency expects to give capital help to fishers used for operational fishing costs so that fishers can do fishing activity optimally.

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