Analysis Of Supply And Acceptance Of Demersal Fish Raw Materials At 99 Sea Tinakin Companies Banggai Sea, Central Sulawesi Province

by Rita Marsuci Harmain

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ABSTRACT

This study aims to produce supply and demand data, significant or not the price of demersal raw fish and fish fillets on supply and demand based on F and T tests, determine the coefficient of determination and correlation coefficient of supply and demand for demersal fish raw materials. Obtaining data through purposive sampling, distributing questionnaires to fishermen and interviewing employees at Company 99 Tinakin Laut Banggai Laut Province of Central Sulawesi, period 2018 and 2019. Data analysis used multiple linear analysis with SPSS 25 software, if it was significant an F test and a T test were carried out. The results showed that the average supply was 35.1 tons and the demand was 34.2 tons. The results of the F test - the average price of fish raw materials and the average price of demersal fish fillets are significant to supply, a significance of 0.05. The results of the T test show that the average price of fish raw materials is partially significant to the supply of fish, but not significant to the demand for demersal fish raw materials. The results of the price T-test obtained that the average fish fillet is partially significant to the supply and demand for demersal fish raw materials. The results of the coefficient of determination show that 21% of the variation in the supply of fish is explained by the average price of fish raw materials and demersal fish fillets, 79% is explained by other variables. For demand, the coefficient of determination is 32%, the variation of the demand for the number of fish can be explained by the average price of demersal raw fish and fish fillets, 68% is explained by other variables. The correlation coefficient is very high, namely supply 0.96 and demand 0.86 for demersal fish raw materials.

Keywords: raw materials, demersal fish, fish fillets, supply, demand.

1 Introduction

Banggai Laut Regency, which is located in Central Sulawesi Province, has quite a large marine fishery resource potential, one of which is demersal fish. This fish has important economic value and is usually found in coral reef areas. Most of the demersal fish, one of which is the type of grouper, snapper, sciaenida and so on. The UN Atlas defines demersal as an area of the continental slope seabed which is in the mesopelagic and bathypelagic zones with the largest habitat on earth, sea depths of more than 4000 m covering 53% of sea level(Nair, 2020) (Nair, 2022)

The potential for marine fisheries resources in Banggai Laut Regency is quite large with an area of $\pm$ 6,671.32 km2 or around 72.83% of the total area. The area is 725.67 km2 with a population of 72.298 people spread across seven sub-districts namely Banggai, North Banggai, Bokan Islands, Bangkurung, Labobo, South Banggai, and Central Banggai Districts. As an archipelago, the average local population is engaged in the profession as a fisherman. Capture fisheries production in Banggai Laut Regency is $\pm$ 25,916.90 tons (Banggai Regency in Figures, 2018). One of the fish companies in Banggai Laut Regency that processes demersal fish raw materials into fish fillets is Company 99 Tinakin Laut. Demersal fish as a food consumption ingredient needed by the human body because it has a high nutritional content, especially animal protein content and has a distinctive taste, makes this commodity the target of consumers outside the region. Fish protein content ranges from 10-20 g/100 g or around 5 -15% and omega-3 fatty acids are abundant in marine fish.(Andhikawati et al., 2021)

Supply and demand for demersal fish raw materials by the company 99 Tinakin Laut which obtains demersal fish raw materials from fishermen in the Banggai Laut waters. The offer was made to meet the demand for frozen demersal fish fillets derived from fresh demersal fish raw materials. Offer is an activity of offering products or services to consumers. The factors that affect supply are the price of the goods themselves, prices of other goods, technology, and forecasts of future prices(Science, 2019).

Demand is the activity of buying a product at a certain price level by consumers. Demand for goods and services that are not accompanied by the supply of goods and services cannot realize transactions in the market. Demand can be fulfilled if the seller provides the goods or services needed(Science, 2019).

Knowledge of the supply and demand for demersal fish raw materials carried out at company 99 Tinakin Laut is not known with certainty so this research was conducted to produce data, an overview of the price significance of demersal fish raw materials and fish fillets and the relationship between supply and demand for demersal fish raw materials at company 99 Tinakin Sea.

2 Research methods

This research was conducted at company 99 Tinakin Laut in Banggai Laut Regency from September to January 2020. The research method used in this study was purposive sampling by distributing questionnaires to 60 fishermen respondents, survey results and interviews with fishermen and the company 99 Tinakin Laut . The data collection period is from 2018 - 2019. The data used comes from primary data and secondary data. The primary data comes from the company 99 Tinakin Laut and fishing communities in the Banggai Laut waters. Secondary data collected to support this research such as data on the potential for demersal marine fisheries resources, related sources from fishing communities(Dokupdf_com_ebook_statistik_for_penelis.Pdf, nd)2007 ;(Taherdoost, 2017);

Data analysis was carried out using inference analysis, namely carrying out the classical assumption test in this case the normality test, homoscedasticity test, multicollinearity test and multiple linear regression coefficient test with simultaneous F test and T test if there is significance in the supply and demand for demersal fish.

The multiple linear regression equation for the supply of demersal fish raw materials at company 99 Tinakin Laut in a multiple linear model is:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$

where

Y : Offer the number of ikan
β_0 :Constant
X_1 : Average Price of Fish demersal
X_2 :Price Average demersal fish fillet
ε_i : $Error$ i.e

Furthermore, the coefficient of determination test (R^2)to find out how much the average price of demersal fish and the average price of demersal fish fillets is on the supply and demand for demersal fish. And to find out the relationship between the average price of demersal fish and the average price of demersal fish fillets, a correlation coefficient test was carried out with the formula:

$$r = \sqrt{R^2}$$

r	Interpretation
(1)	(2)
0	No connection
$0 < r \leq 0.2$	Very low
$0.2 < r \leq 0.4$	Low
$0.4 < r \leq 0.6$	Enough
$0.6 < r \leq 0.8$	Tall
$0.8 < r \leq 0.99$	Very high
1	Perfect

Primary data was processed using the Statistical Package for the Social Sciences (SPSS) 25 program(Foong et al., 2018).

3 Discussion result

Results pProduction of demersal fish raw materials by company 99 Tinakin Laut in Banggai Laut Regency for three (3) periods, namely October, November and December 2018, namely 395,584 tons and frozen demersal fish fillets, namely 110,762 tons. In 2019, the same period produced 498,466 tons of demersal fish raw materials and 182,209 tons of frozen demersal fish fillets. The results of these data illustrate the increase in production of demersal fish raw materials and demersal fish fillets in different years in the same period. Availability of data on increased

production of fresh demersal fish and frozen demersal fish fillets due to requests by the company 99 Tinakin Laut. The increase in fishing production in waters depends on the season and conditions of the waters for fishing. In addition, fishing gear facilities support fishing. Capture fisheries production in Indonesia increased by 7.5% from 2017 to 2018. From 2014 to 2018 the number of fish consumption increased by 6,823% per year with potential fishery reaching 12.54 million tonnes per year (KKP, 2018).

The production of demersal fish catches is based on supply and demand by the company, thus encouraging fishermen to fulfill the availability of stocks of demersal fish raw materials.

Based on the results of data acquisition through questionnaires, the results of interviews were distributed to sixty (60) fishermen respondents who were in the Banggai Laut waters area. The average supply of demersal fish raw materials in 2018 was 39.3 tons with a standard deviation of 35.1 indicating that the supply of fish raw materials reached fishermen was 35.1 tons of the total. The multiple linear regression equation for supply and demand for demersal fish raw materials uses two independent variables, namely the average price of demersal fish (X1) and the average price of demersal fish fillets (X2).
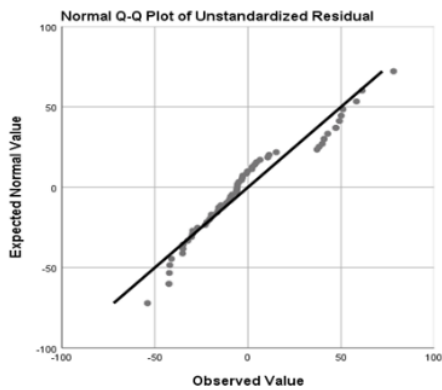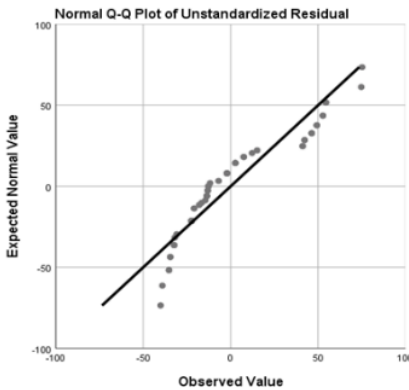

Figure 1. Supply normality test Figure 2. Demand normality test demersal fish raw materials demersal fish raw materials

The results of the normality test for supply and demand for demersal fish raw materials (Figures 1 and 2) show that the residuals or errors are normally distributed because they lie around a straight line.
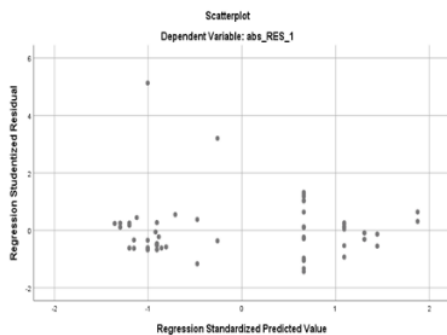

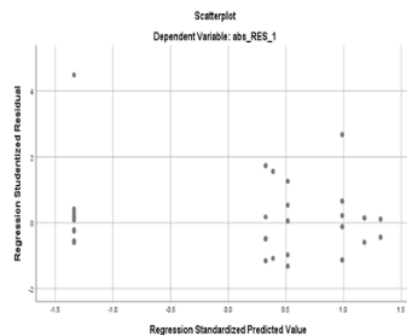**Figure 3. Homoscedasticity test supply of demersal fish raw materials**

Figure 4. Homoscedasticity test raw material demand demersal fish

Based on the results of the supply and demand homoscedasticity test for demersal fish raw materials, it was found that there was no heteroscedasticity problem because the data points spread above and below or around the

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	135.330	28.378		4.769	.000		
	Harga Ikan Demersal	-.002	.001	-.285	-2.369	.021	.956	1.047
	Harga Filet	-.001	.000	-.303	-2.518	.015	.956	1.047

number 0, not gathering only above or below just the bottom and the spread of the dots does not form a specific pattern such as a wavy or narrow widening pattern.

a. Dependent Variable : Supply

Figure 5. Multicollinearity test results for demersal fish raw material supply

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	83.692	26.364		3.174	.002		
	Harga Ikan Demersal	.000	.001	-.061	-.472	.639	.915	1.093
	Harga Filet	-.001	.000	-.347	-2.698	.009	.915	1.093

a. Dependent Variable : Demand

Figure 6. . Multicollinearity test results for demand for demersal fish raw materials

The multicollinearity test on the supply and demand for demersal fish raw materials resulted in a tolerance value of > 0.1 and a VIF value < 10.00, which means that there were no symptoms of multicollinearity in the regression model (Figures 5 and 6).

Table 1 Simultaneous test results on ANOVA.

ANOVAa

Model		Sum of Squares	df	MeanSquare	F	Sig.
1	Regression	15247.492	2	7623,746	7,573	.001b
	residual	57380.277	57	1006672		
	Total	72627.768	59			

a. Dependent Variable: Supply

b. Predictors: (Constant), Fillet cost, Demersal Fish Cost

Based on the results of the multiple linear regression coefficient test from the results of the simultaneous F test on ANOVA (Table 1) is obtainedthe calculated F value is 7,573 with a significance value of 0,001. With a significance level of 95%, a significance number of 0.001 <0.05. variable the average price of demersal fish raw materials and the average price of demersal fish fillets have a significant effect on the supply of fish raw materials together.

The results of the T test obtained the average price variable for demersal fish raw materials was t = 2.369 with a significance of 0.021. At a significance level of 0.05, the average price of demersal fish raw materials ispartially significant effect onsupply of fish. For the average price variable for demersal fish fillets, it is obtained t = 2.518 at a significance of 0.015. The average price of a demersal fish fillet is berpartially significant effect onsupply of fish raw materials.

Table 2. Simultaneous test results on ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9419.386	2	4709.693	4.507	.015[b]
	Residual	59560.838	57	1044.927		
	Total	68980.224	59			

a. Dependent Variable: Demands
b. Predictors: (Constant), Fillet cost, Demersal Fish Cost

The results showed that the F count was 4.507 at a significance number of 0.015 <0.05, a significance of 95%. The variable average price of demersal fish raw materials and the average price of demersal fish fillets simultaneously have a significant effect on the demand variable for the amount of fish raw materials (Table 2).

The demand for fish in Zambia is likely to continue to increase marked by projected increases in fish prices until 2030. Fishing is the dominant supplier besides aquaculture and imports of fish as fish supplies to meet demand until 2030 (Tran et al., 2019)

The results of the t test = -0.472 at a significance of 0.639 with a level of 0.05 yielded an average price of raw demersal fish withoutpartially significant effect ondemand for fish. However, for the average price variable for fish fillets based on the T test, it was obtained t = -2.698 with a significance of 0.009 at a significance level of 0.05, the average price for demersal fish fillets waspartially significant effect ondemand for fish raw materials. Based on the results of the multiple linear regression equation based on the formula:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$
$$Y = 135.33 - 0.002 X_1 - 0.001 X_2$$

where

Y : Offer amount iright
β_0 :Constant
X_1 : Average price of fish demersal
X_2 :Demersal fish fillet average price
ε_i : *Erroni*.e

This shows thatif all independent variables are considered constant or have a value of 0 (zero), then the supply of fish raw materials is 135.33 tons. If the average price of demersal fish raw materials increases by 1 unit and other variables are held constant, then the supply of fish raw materials decreases by 2 kilograms. If the average price of demersal fish fillets increases by 1 unit and other variables are held constant, then the supply of fish raw materials decreases by 1 kilogram. The average price of demersal fish raw materials and demersal fish fillets increases by 1 unit, so the quantity of fish supplied will decrease by 3 kilograms.

Table 3. The test results of the coefficient of determination of the supply of fish raw materials

Summary models

Model	R	R Square	Adjusted R Square	std. Error of the Estimate
1	.458a	.210	.182	31.72809

a. Predictors: (Constant),fillet cost, demersal fish cost

Test resultsThe coefficient of determination from the multiple linear regression equation above shows that 21% of the variation in the supply of fish raw materials can be explained by the average price of demersal fish and demersal fish fillets. Meanwhile, 79 percent is explained by other variables outside the equation (Table 3). Correlation coefficient (r) supply of fish raw materials based on the formula:

$$r = \sqrt{R^2}$$

di peroleh $r = \sqrt{0.458^2}$ yield , indicating that there is a very high correlation with the supply of fish. $r = 0.96$

The results of multiple linear regression on the demand for fish raw materials based on the formula are obtained as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_i$$
$$Y = 83.692 + 0,000X_1 - 0,001X_2$$

Data from multiple linear regression results of the demand for fish raw materials explains that if all independent variables are considered constant or have a value of 0 (zero), then the demand for fish is 83,692 tons. If the average price of demersal fish increases by 1 unit and other variables are held constant, the demand for fish will be constant. If the average price of demersal fish fillets increases by 1 unit and other variables are held constant, the demand for fish will decrease by 1 kilogram. The average price of demersal fish and fish filet increases by 1 unit, so the quantity demanded of fish will decrease by 1 kilogram.

Table 4. Results of the coefficient of determination of fish demand

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.370[a]	.137	.106	32.32533

a. Predictors: (Constant), fillet cost, demersal fish cost
b. Dependent Variable : Demand

The results of the test for the coefficient of determination show that 32% of the variation in demand for fish raw materials can be explained by the average price of demersal fish and demersal fish fillets. 68% is explained by other variables outside the equation. Correlation coefficient (r) demand for fish raw materials based on the formula:

$$r = \sqrt{R^2}$$

di peroleh $r = \sqrt{0.370^2}$ yield , indicating that there is a very high correlation relationship on the demand for fish raw materials. $r = 0.86$

4 Conclusion

The average price of demersal fish raw materials and the average price of demersal fish fillets have a significant effect on the supply and demand for fish raw materials. However, partially the average price of demersal fish has an effect on the supply of fish raw materials, but does not affect the demand for fish raw materials. For the average price of demersal fish fillets, it partially affects the supply and demand for fish raw materials. The correlation coefficient of supply and demand for fish raw materials shows a very high correlation.

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