

## STRUCTURE-CONDUCT-PERFORMANCE ANALYSIS OF SKIPJACK FISH INDUSTRY IN BANDA ACEH CITY

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### ABSTRACT

The purpose of this study is to describe the structure conduct performance in the skipjack fish industry in Banda Aceh City, Analyze the influence of *structure conduct* performance in the skipjack fish industry in Banda Aceh city, and *analyze the factors that affect the performance of the skipjack fish industry in Banda Aceh city*. The number of samples is 4 companies that manage Skipjack Fish in Banda Aceh City. The market structure of the skipjack fish industry in Banda Aceh is oligopoly as seen from the value of market concentration and barriers to entry from 2011 to 2020. During this time span, the structure of the skipjack fish industry also showed market concentration and barriers to entry that were getting lower in value from year to year. This shows that competition in the skipjack fish industry is increasing. The skipjack fish industry in Banda Aceh sets a price strategy by following price rules made by outside parties such as the United States importing countries, for product strategies are carried out by classifying products based on the size and type of product treatment such as fresh skipjack fish and frozen skipjack fish. In the performance dimension, it was found that the average value of PCM for the 2011-2020 period was 33.88 percent with the largest PCM value occurring in 2018 at 44.33 percent and the lowest PCM in 2014 at 19.07 percent. Meanwhile, the average value on x-eff for the 2011-2020 period was 102.93 percent. The largest amount of internal efficiency occurred in 2019 at 147.99 percent, and the smallest x-eff value occurred in 2017 at 71.42 percent. The independent variables that are considered to affect the dependent variable (PCM) are CR4, MES, X-eff, PROD, and JLP. However, only x-eff and PROD have a significant effect on PCM. The rest such as CR4, MES, and JLP have an intangible effect because the value is greater than the real level of 0.05.

**Keywords:** Skipjack Fish Industry, Market Structure, Market Performance

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### INTRODUCTION

Indonesia's industrial locations aim to solve fundamental socioeconomic problems by expanding employment opportunities, meeting basic social needs, predicting production and alleviating poverty. One way to accelerate the country's development process is to use industrialization strategies (Basmal et al., 2017).

The rapid growth of the industrial sector allows large companies with strong and large capital, to create fierce competition between companies in the sector (Porter, 2008). In reality, competition can be healthy or unhealthy competition that can defeat opponents. Unfair competition can be monopolistic practices or barriers to entry (Begum, 2018).

The market structure encourages business actors to make various strategic decisions in facing competition. This is often referred to as corporate behavior. Competitive behavior can be reflected in pricing strategy, promotion strategy, production strategy, business integration, and R&D (Mankiw, 2009). Determining the right competitive strategy has an impact on the growth and sustainability of the company. Therefore, market structure influences company behavior in setting policies that determine company performance both in terms of profit and sustainability (Alexandra & Eriandani, 2022).

This is a driver of the importance of understanding the market structure by every business actor in improving their company's performance (Naylah, 2010). For this reason, the *Structur*

e-Conduct-Performance (SCP) paradigm can be applied in describing the overall state of the market both structure, behavior and performance resulting from industry. This SCP paradigm can be used in every industry such as the food industry which continues to grow from time to time (Lubis et al., 2022).

Structured Behavioral Efficiency Theory (SCP) proposes that market structure affects the performance of an industry. From a firm's competitive point of view, the market structure aims to support unfair competition practices to maximize profits.

Businesses can maximize their profits through market forces. This is typical for companies with a very dominant market share (dominant position). The SCP approach itself was first introduced by Mason in 1939 and adapted by Bain in a 1951 study (Febriliana, 2022). Companies are also influenced by various variables that shape their market structure.

Industrial growth aims, among other things, to solve major socioeconomic problems by expanding employment opportunities, meeting people's basic needs, leveling production and reducing poverty. One way to accelerate the process of national development is to adopt an industrialization strategy. Small-scale industries are central to regional economic development. Indonesia has many food industries that are very prospective and developing, especially the Banda Aceh food industry, namely the skipjack fish industry.

In general, the skipjack industry is very profitable for all companies. Economically, skipjack has made a significant contribution and has been shown in most coastal communities through employment as fishermen both in the fishing, processing, trade and helper industries.

One of the food industries that continues to grow is the skipjack fish industry produced by legal entities. There are several skipjack fish industries that have been recognized in the city of Banda Aceh, namely PT. Nagata Prima Cakalang which is located at Jl. Kelapa, No. 24, Kampung Baru, Kp. Baru, Banda Aceh. Then the skipjack fish industry CV. Tuah Bahari which is located at TPI Lampulo Fisheries Complex, Banda Aceh. Then the skipjack fish industry PT. Aceh Lampulo Jaya Bahari which is located at H8M9+JWV, Lampulo, Kec. Kuta Alam. Banda Aceh City. Furthermore, the skipjack fish industry CV. Yakin Pasifik Cakalang which is located at Komp. PPS Jln Sisingamangaraja No. Ujung, Lampulo, Kec. Kuta Alam. Banda Aceh City. Aceh. The marketing data of skipjack fish in the city of Banda Aceh every year are:

No	IKM SECTOR	SKIPJACK FISH PRODUCTION (TON)				
		2016	2017	2018	2019	2020
1	PT. Nagata Prima Skipjack	669	681	701	835	849
2	CV. Tuah Bahari	320	550	565	689	694
3	PT. Aceh Lampulo Jaya Bahari	495	541	549	329	329
4	CV. Yakin Pasifik Skipjack	394	392	396	213	228
Sum		2248	2404	2457	2560	2594

Source: Aceh Marine and Fisheries Service (2021)

Based on the observations of researchers on several skipjack fish industry companies in the city of Banda Aceh shows that the production of skipjack fish is less developed in the city of Banda Aceh. This happens because not all skipjack fish industry companies in the city of

Banda Aceh apply the structure conduct performance (Erfin, 2018). The many problems faced by companies when implementing the conduct performance structure are one of them is poorly understood by market instructors, so the sale of skipjack fish is only within the scope of Indonesia, less understood in sales by export and import (Gavurova et al., 2017).

Based on the problems above, researchers are interested in examining more deeply the structure conduct performance of the skipjack fish industry in companies engaged in the processing and marketing of the skipjack fish industry, namely with the title "Analysis of the Structure-Conduct-Performance of the Skipjack fish industry in Banda Aceh City".

## **METHOD**

The number of samples is 4 companies that manage the skipjack fish industry in Banda Aceh City. The location of the research was carried out in Banda Aceh City. Data collection is carried out by observation and individual approach through direct observation activities to the field to identify industries that manage skipjack fish (Creswell & Creswell, 2017). Data analysis was carried out by analyzing descriptive and quantitative statistical analysis used in this study. Descriptive data will be analyzed with market characteristics and behaviors created in the skipjack fish industry market (Harriss, 1979). Quantitative data were analyzed by: (a) *Concentration Four* (CR4), *Minimum Efficiency Scale* (MES), to determine the structure of the skipjack fish industry, and (b) As mentioned, performance measurement will be measured through *Price Cost Margin* (PCM) and *Internal Efficiency* approaches (X-eff). Quantitative methods are used to analyze the structure and performance of the skipjack fish industry with the SCP approach and for the analysis of the performance of the skipjack fish industry in Banda Aceh which is influenced by the *Minimum Efficiency Scale*, *Concentration Four*, *Internal Efficiency*, productivity and a number of companies used OLS (Ordinary Least Square) approach with the help of Microsoft Excel 2010 software, Eviews 10.

### ***Market Share Analysis***

Each company has a different market share ranging from 0 to 100 percent of the total sales of all markets. Market share describes the profit that a company earns from its sales.

$$MS_i = X 100 \frac{S_i}{S_{tot}} \quad (1)$$

Where:

MS<sub>i</sub>= company market share i (%)

S<sub>i</sub>= company sales i (rupiah)

S<sub>tot</sub>= total sales of all companies (rupiah)

### ***Concentration Ratio Four Analysis***

The concentration level can be calculated through the Concentration Ratio (CR). The concentration ratio is a percentage of the industry's total output or sales revenue. The ratio of a number of firms measures the relative market share of the total industrial output accounted for by those firms.

$$CR_4 = MS_1 + MS_2 + MS_3 + MS_4$$

## **RESULTS AND DISCUSSION**

The respondents in this study were the owners of each factory. Of the 4 questionnaires given to each factory, all questionnaires were filled out properly and completely so that no re-questionnaire distribution was needed. *The response rate* of this questionnaire is very high, reaching 100% (Jatmiko et al., 2015).

In marketing activities, it is known that the skipjack fish industry in the city of Banda Aceh prioritizes the distribution of its products not only to the local market but also to international markets such as exports to Japan, China, the Philippines, Brunei Darussalam and Timor Leste. Descriptive research on the characteristics of the skipjack fish industry will not be included in the data processing process. These data are only used as supporting data to provide additional justification for the results of the study (Jaya, 2001).

The output produced is frozen *product* in raw condition. This product is deliberately frozen with the aim of lowering the temperature to a certain point that can inhibit the deterioration process by microbes so that a more durable product will be produced and maintain the quality of fish quality. Freezing is intended to preserve the natural properties of fish. Freezing uses a lower temperature, which is far below the freezing point of fish (Jian & An, 2018). Frozen skipjack is traded in the domestic market as well as the global market (export). Frozen skipjack consumers are daily/retail fish traders (collectors), horeka (hotels, restaurants and catering), MSMEs (smoking and smoking) and other fish processing units (UPI) that use frozen skipjack as raw material into other derivative products, such as shredded fish, fish nuggets and others (Gujarati, 1978).

### **Production Process**

The production process is an activity or process of converting raw materials into various products (finished materials) so that they have added value (Jufri et al., 2014). The production process in the skipjack fish industry in Banda Aceh City uses the main raw material of fresh skipjack fish. The skipjack fish production process in Banda Aceh City generally consists of several process parts that are connected as follows

Receipt of raw materials, raw materials originating from fishermen are immediately unloaded at the company's fish port. Fish unloaded from fishing boats should not be thrown or slammed because it will make the fish mushy so it is done using human labor. In general, 4 skipjack fish industries in Banda Aceh City implement a frozen skipjack fish production process based on SNI 4110:2014.

- a. Raw materials are handled quickly, meticulously and sanitary by maintaining fish in frozen conditions.
- b. Sortation, Fish are separated by type, quality and size quickly, carefully and sanitary in cold conditions
- c. Washing, Raw materials are washed using running water quickly, meticulously and sanitary in cold conditions.
- d. Weeding, Fish removed entrails and/or gills and/or scales quickly, carefully and sanitarily in cold conditions, frozen fish do not need to be melted.
- e. Fish weighed to specifications quickly, meticulously and sanitary in cold conditions
- f. Arrangement, in the pan Fish arranged in a pan quickly, meticulously and sanitary in cold conditions

- g. Fish is frozen by quick freezing using a *Contact Plate Freezer* (CPF) or *air blast freezer* (ABF) for frozen *blocks*, while for Individual *Quick Freezing* (IQF) the fish is frozen by quick freezing using an ABF freezer until the central product temperature reaches  $-18^{\circ}\text{C}$ .
- h. Glassware Products are dipped in cold water or poured cold water for *frozen blocks*, while for IQF products are accommodated in baskets and dipped in cold water, quickly, meticulously, and sanitically.
- i. Packaging and Labeling Products are packaged and labeled quickly, meticulously and sanitically. Packaging materials must be clean, not contaminating packaged products, made of good materials and meet applicable requirements. Products are packaged quickly, meticulously, sanitary and hygienic. Packaging is carried out under conditions that can prevent contamination. Every product packaging to be traded is labeled in accordance with applicable regulations
- j. Frozen storage Products are neatly arranged in a frozen storage warehouse and storage temperatures are maintained stable at a maximum of  $-18^{\circ}\text{C}$  with a *First In First Out* (FIFO) storage system.
- k. Loading Packaged products are fast, meticulous, sanitary and hygienic and loaded in transportation equipment protected from causes that may damage or degrade quality by maintaining a maximum product center temperature of  $-18^{\circ}\text{C}$ .

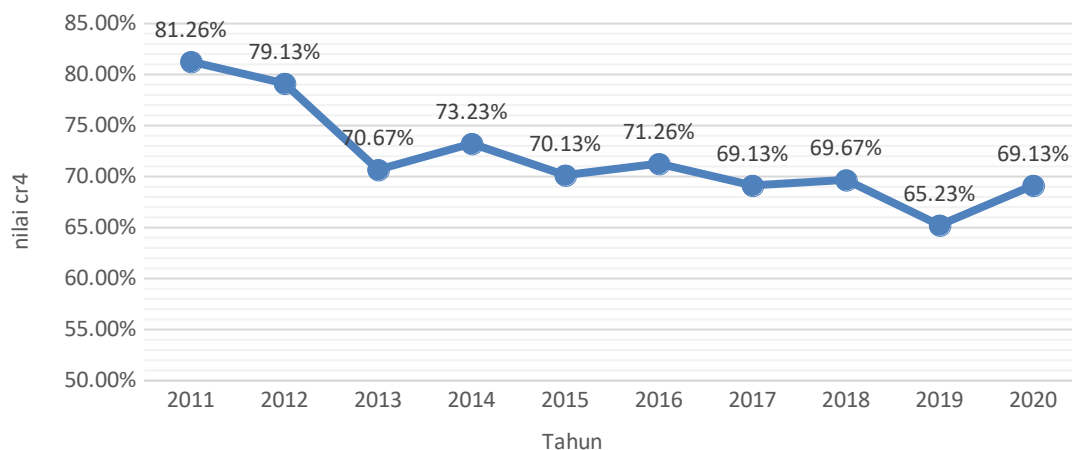
This shows that the four largest firms have competition in oligopoly markets. According to Jaya (2001) oligopoly markets can be distinguished into two types, namely loose oligopoly and strict oligopoly. This distinction is based on the magnitude of the market concentration value.

If the market concentration ranges from 40-60 percent then it is grouped into a loose oligopoly, while the market concentration which ranges from 60-100 percent is classified into a strict oligopoly, it can be concluded that the skipjack fish industry in Indonesia is a tight oligopoly market. In industrial economics, this oligopoly system is indeed considered a strict oligopoly, but in the sense of agricultural prices, this oligopoly system is classified in a quasi-competitive model although in its sense these two things have the same meaning. CR4 values that fluctuated throughout 2011-2020 tended to increase.

The largest CR4 occurred in 2011 at 81.26 percent. This can be caused by the high value of output in that year, causing the added value to also increase dramatically. In addition, the result of the soaring output value of each firm will increase the total output of the industry as a whole. This can be caused by input factors that also increase such as increasing the amount of production, and labor that also increases, so that the percentage of total output will also increase drastically. This high level of concentration is enough to illustrate that the number of producers is relatively small, the barriers are high enough to enter the market, and the competition is quite high. Although the development of CR4 value in the skipjack fish industry in Banda Aceh shows a downward trend, it remains in the area of a tight oligopoly market structure. This tight oligopoly market structure will create cooperation between producers to obtain profits above normal prices.

The oligopoly market conditions formed in the skipjack fish industry will form a special characteristic of the industry itself. This oligopoly market by itself has the following characteristics:

1. High barriers to entry. This poses barriers for new entrants to enter their respective sectors. Thus limiting the competition to only those who are already in the group. The oligopolies control over specific inputs, such as resources, prices, and production, made it difficult for new firms to survive. In addition, high capital requirements, licenses, patents, market demand, economies of scale, limited pricing, and customer loyalty limit the entry of new businesses.
2. The Power of Making Prices. In an oligopoly, dominant market participants are influential enough to determine the price of products and services. And other businesses or small players follow suit. This helps avoid potential price wars and price rigidity. All companies stick to what has been decided, thus ensuring price stability in the sector.
3. The interdependence of the enterprise. Due to its large size and minimal competition, each firm in an oligopoly market structure influences the others. It includes decisions made in concentrated markets, such as product pricing, quality standards, and production planning. This also means that every company must be aware of the reactions of others to their actions.
4. Distinguished Products. One characteristic of oligopoly is the focus of its members on improving product quality or offering benefits to make their brand unique. Although the products of companies A and B are similar, there must be something that distinguishes them. And that's what turns out to be the unique selling proposition (USP) of each brand in the oligopolistic industry.
5. Non-Price Competition. Oligopolies do not emphasize competing with each other on the price front. Instead, they try different approaches, such as rewarding customers for their loyalty, differentiating their product offerings, providing sales promotion schemes, acting as sponsors, etc. They do it strategically so they don't lose their customers in a price war.



**Figure 2.**  
CR4 skipjack fish industry banda Aceh in 2011 – 2020

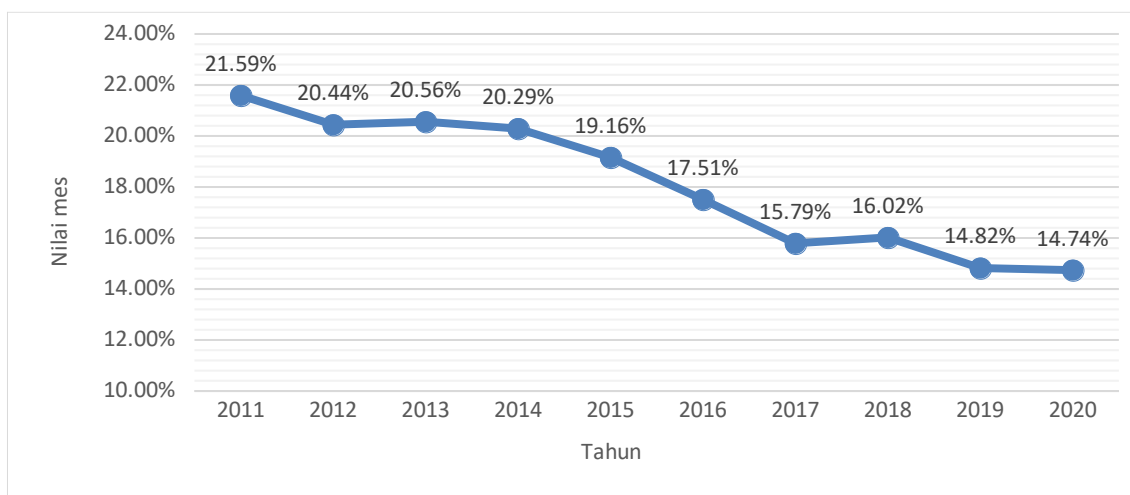
### **Barriers to Entry**

Based on the data presented in figure 3, it is found that the entry and exit conditions of an industry can describe the competition that occurs in the industry so that barriers to market entry can be detected. Through the Minimum Efficiency Scale (MES) approach, it can be known the

percentage of barriers to market entry. The MES value is obtained by dividing the value of the firm's largest output by the total output in the industry. From 2011 to 2020, the average MES value of the skipjack fish industry in Indonesia was 18.09 percent.

The higher the MES value, the more difficult the barriers to market entry will be. According to Sari (2011), the MES value of more than 10 percent illustrates an industry's high market entry barriers. The largest MES value occurred in 2011, which was 21.59 percent. This is due to the high value of skipjack fish output in 2011. Not much different from the effect of output on CR4 value, this increase in output value can be caused due to an increase in input value. In addition, the large number of companies in the market also affects because the smaller the number of companies, the smaller the opportunity to compete.

In contrast, the lowest MES value was in 2020 which was only 14.74 percent. This can be caused by the decline in the value of skipjack fish output from 227 billion rupiah to 212 billion rupiah in 2020 so that the percentage of industrial output also decreases.



**Figure 3.**  
MES of skipjack fish industry banda Aceh in 2011 – 2020

### Skipjack Fish Industry Behavior

Market behavior in the export-oriented skipjack industry in Indonesia is analyzed descriptively to obtain information about company behavior in the Indonesian skipjack industry which is explained through price strategies, product strategies and promotional strategies carried out by companies.

### Price Strategy

The oligopoly structure of the skipjack market both domestically and in the international market causes the pricing process to be determined by greater power. The main destination countries for Indonesian skipjack exports are Japan and the United States where as buyers the two countries have the power to regulate the trade of national skipjack commodities.

The strict export regulations required by the destination country require Indonesia to follow all existing regulations to export. The country is a market ruler who has the right to set fish prices, while as a follower of the Indonesian market cannot determine prices. This also happened to the skipjack fish industry in Banda Aceh, where product prices follow the rules of

the United States. Based on the results of the analysis conducted previously, it can be seen that for the USA market, the price of skipjack fish is higher than other markets but must meet the quality of skipjack exports and food safety guarantees as determined by the FDA. As for the Japanese market, the price fluctuates relatively due to pricing through the auction system.

**Table 5.**  
Skipjack Fish Price at Bangkok Landings International Market (USD/MT)

<b>Month</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Jan	1,550	1,280	1,350	1,200	1,600
Feb	1,480	1,480	1,475	1,300	1,650
Mar	1,700	1,600	1,500	1,350	1,900
Apr	1,800	1,450	1,400	1,340	1,800
May	1,600	1,200	1,200	1,280	1,600
Jun	1,600	1000	1,200	1,350	1,425
Jul	1,300	1,200	1,550	1,500	1,600
Aug	1,450	1,350	1,625	1,400	1,800
Sep	1,650	1,100	1,325	1,300	1,600
Oct	1,525	900	1,300	1,500	1,580
Nov	1,400	900	1,400	1,600	1,700
Dec	1,300	1,050	1,300	1,750	1,700

Source: Thai Union Group PCL, 2022

Indonesia as one of the largest skipjack exporting countries in the world should be able to have high bargaining power for determining prices for the destination market, but skipjack is a product that is relatively easy to substitute with fish and other protein commodities causing a weak bargaining position in the destination market. Therefore, improving the quality of skipjack and also international trade negotiation policies to reduce tariff and non-tariff barriers to Indonesian skipjack is very important to be carried out. The price of skipjack is very dependent on the type of skipjack commodity and the species of skipjack caught. The Japanese market as the main export destination of Indonesian skipjack is famous for its culture of eating fish and believes that skipjack fish in fresh conditions has higher nutrition than *frozen* fish.

The results of Yusra, Hamzah & Syahnur's (2014) research show that the Japanese market is a very potential market for fresh pelamis katsuwonu from Indonesia which is strongly influenced by Japan's GDP per capita, exchange rates and also the price of *fresh pelamis katsuwonu* (Pan & Pooley, 2004).

### **Product Strategy**

The high economic value of skipjack fish and the large demand in the world market make the development of the national skipjack fishery industry so rapid, not only in frozen skipjack products and fresh skipjack products, and in the form of canned skipjack or other processed skipjacks. Fresh skipjack exported by Indonesia is in the form of loin, whole, block and cut. As for frozen skipjack, more varied products include pocket skipjack, cube, fillet, loin, poke cube, whole, steak, strip meat, chunks steaks, scarp meat, slices and so on which are tailored to buyer demand in the destination country.

Processed skipjack fish is dominated by canned skipjack fish which is processed with various additives such as oil and brine, besides that skipjack fish is processed in the form of dried smoked. These various products are adjusted to the destination country, based on the main destination country, it can be seen that for the USA market frozen skipjack is the dominant product with a percentage of 64% followed by processed skipjack 34% and fresh skipjack only 2%. Different conditions occur in Japan as the main destination country where Indonesian skipjack exports are dominated by fresh skipjack at 54%, frozen skipjack at 38% and processed skipjack at 9%, this is certainly related to the taste of the Japanese population who prefer fresh fish over processed fish. Another major destination country is Thailand which needs skipjack fish raw materials for the skipjack processed industry in Thailand. The composition of Indonesian skipjack types exported to Thailand consists of 95% frozen skipjack, 4% fresh skipjack and 1% canned skipjack. By improving the quality of skipjack fish, starting from handling raw materials on board to handling before export, it can increase the competitiveness of Indonesian skipjack.

### **Promotion Strategy**

Promotion is one of the efforts to introduce products and at the same time a means to form a product image in front of consumers which in turn will increase sales volume. Promotion involves many parties and costs are quite high, but all of that if done properly will bring huge profits. For this reason, in order for export volume to increase both in terms of the variety of skipjack fish products and the wide reach of consumer segments, the trade promotion is not just persuading consumers but rather leads to giving confidence in the value and benefits of Indonesian skipjack fish products.

This needs to get support from trade attaches representing Indonesia both in countries that have become Indonesia's export destinations, as well as other countries that are still open opportunities to be entered by the Indonesian skipjack fish export market. Saudi Arabia, Australia and Africa can be alternative markets for Indonesia in the expansion of skipjack exports. This is because in the USA and Japan markets Indonesia is only a price taker so promotion is needed for Indonesian skipjack to be able to enter the potential alternative market for Indonesian skipjack. In addition to the Indonesian government, promotional strategies are also carried out by business actors by participating through exhibitions and also sending samples to several potential buyers.

### **Skipjack Fish Industry Performance**

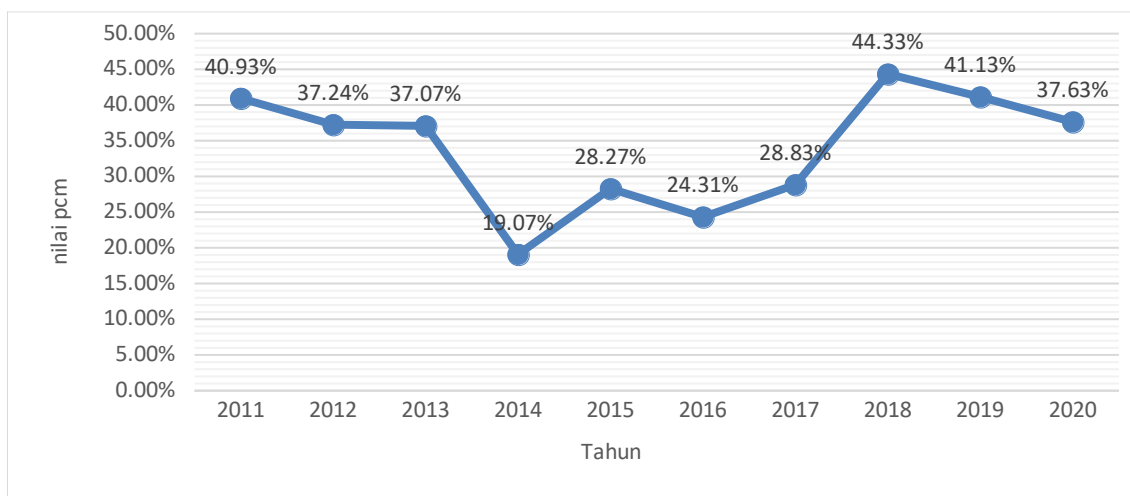
Analysis of market performance will be illustrated by the magnitude of the Price Cost Margin (PCM) value, this is because PCM is used as an indicator of the company's ability to increase prices above production costs and illustrate the profit / excess revenue over direct costs. In the skipjack fish industry in Indonesia, PCM is influenced by other variables, such as the concentration ratio of the four largest companies (CR4), Minimum Efficiency Scale (MES), internal efficiency (X-eff), Productivity (PROD), and a number of companies (JLP).

### **Price Cost Margin (PCM)**

Based on the data presented in figure 4, it is found that the condition of approach with PCM is carried out because the level of profit obtained by a company is confidential and not to be

published so PCM acts as an indicator of profits on direct costs obtained by a company. In the skipjack fish industry, the PCM value has an average value of 33.88 percent, with the highest PCM value occurring in 2018 at 44.33 percent and the lowest PCM occurring in 2014 at 19.07 percent.

The value of PCM that occurred in 2018 can be caused by the added value of the industry which increased dramatically followed by small labor costs and accompanied by the high value of the goods produced. The high value of PCM can also be caused by the skipjack fish industry which continues to experience an increase in demand so that producers continue to increase production in 2018 with the value of goods produced reaching 8,401,116 Kg or 601,668 Kg more than the previous year. In addition, the amount of output value far exceeds the input value so there is no doubt that the added value has also increased dramatically, this added value is considered to still be able to cover the large input value of labor so that in 2018 the value of PCM is very high. In 2014 it was considered to have the lowest PCM value of 19.07%. This is alleged because the amount of added value is still difficult to cover input costs by comparing the number of goods produced.



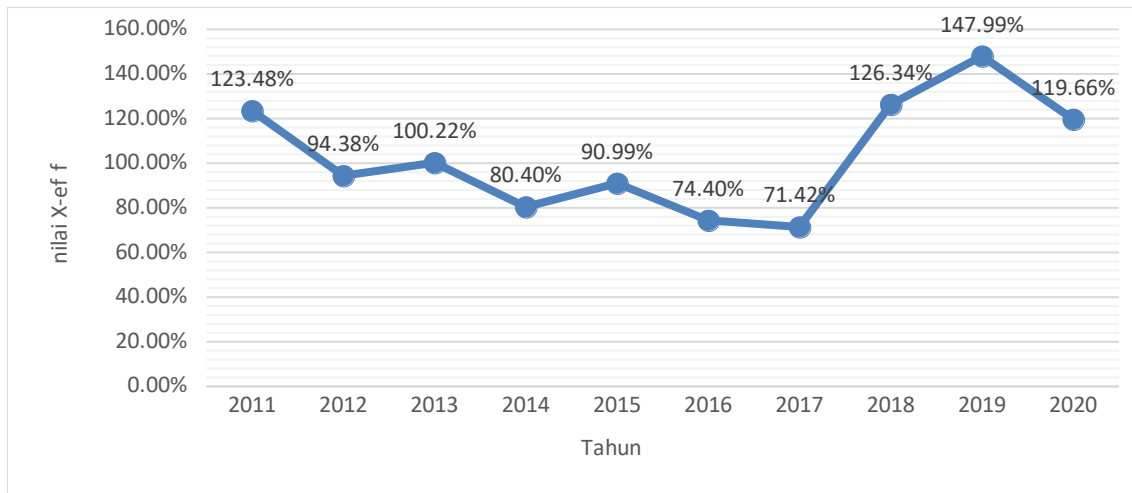
**Figure 4.**  
PCM of skipjack fish industry in Banda Aceh in 2011 – 2020

### Internal Efficiency (X-Eff)

Based on the data presented in figure 5, it was found that the condition of a performance efficiency analysis carried out as a market performance approach is described as an indicator of a company in the industry to reduce production costs, this is also used to determine profits because the higher the internal efficiency, the greater the profits obtained. The internal efficiency value in the skipjack fish market tends to fluctuate every year from 2011-2020, with an average internal efficiency value of 102.93 percent.

The largest internal efficiency value was in 2019, which was 147.99 percent. It can be concluded that the company can reduce its production costs because the amount of added value obtained is able to cover the input costs incurred. In addition, a very high output value can also be used as a supporting factor. In contrast, the smallest efficiency value is in year 2017 which is 71.42 percent.

When viewed through comparison, this year the difference between the value of output and the value of input is relatively small in number, so that the added value produced becomes smaller. The amount of added value is considered unable to meet input costs so that the profits obtained are very small. The high value of these inputs can be triggered due to the large cost of technology used to produce output, the high cost of raw materials, and so on.



**Figure 5.**

X-eff of skipjack fish industry in Banda Aceh in 2011 – 2020

### Test Relationship Analysis

The relationship of the test analysis of the structure and factors that affect this performance can be done using the Ordinary Least Square method or with what is often called OLS (Ordinary Least Square). A model can be said to be good if it passes statistical tests and econometric tests. Statistical tests include the coefficient of determination test (R<sup>2</sup>), t test, and f test. While in econometric tests, a model must be free from violations of assumptions such as multicollinearity, heteroscedasticity, autocorrelation, and normality tests. The following equations are applied to the Relationship Analysis Test.

$$PCM = + MES + CR4 + X\text{-eff} + PROD + JLP + \varepsilon \quad \alpha \quad \beta_1 \quad \beta_2 \quad \beta_3 \quad \beta_4 \quad \beta_5$$

### R-Squared Test (R<sup>2</sup>)

Based on the value of the regression model, the R-Squared value or the value of the coefficient of determination obtained is 91.8 percent, which means 9.8. The 3 percent diversity of dependent variables (PCM) can be explained by independent variables in the model consisting of MES, CR4, Productivity (PROD), X-eff, and Number of Companies (JLP) variables. While the remaining value of the coefficient of determination is 1. The 7 percent can be explained by other variables outside the model. As for the R-adjusted test, the value is 96.3%.

### Test F

The Probability F-Statistic value obtained in the model is 0.001 with the real level is five percent or 0.05. This shows that the value of the Probability F-Statistic is smaller than the real level value (0.027 < 0.05) so that it can be concluded that there is at least one independent

variable that has a real effect on the dependent variable so that this model is feasible to be used as an estimating parameter.

### **Test t**

The results of the t test can be seen from the value of the independent variable whose probability value is smaller than the real level. The MES, CR4, and JLP variables have values of 0.688, 0.634, and 0.510 respectively where the value is greater than the real level of five percent or 0.05 so these variables do not have a real effect on the dependent variable (PCM). While the productivity (PROD) and internal efficiency (x-eff) variables have values of 0.0003 and 0.0015 where the value is smaller than the real level of 0.05 so that these variables have a real effect on PCM. It can be concluded that in this model only the prod and x-eff variables have a real effect on the dependent variable (PCM).

### **Multicollinearity Test**

A multicollinearity test is performed to see if there is a linear relationship between independent variables in the regression model. The multicollinearity test can be seen from the VIF value in the model, provided that if the VIF value in the variable is less than 10 then there is multicollinearity. From the regression results, it can be seen that there is no VIF value of each variable that is more than 10 so it can be concluded that in this model there is no multicollinearity so that the model is feasible.

### **Autocorrelation Test**

Autocorrelation tests are carried out to determine the relationship between the residuals of one observation with the residuals of other observations. The autocorrelation test can be seen with Durbin-Watson values. In appendix 7 it is shown that the estimated results show a Durbin-Watson value of 1.96297. This value is in the range of 1.55-2.46 so it can be concluded that there is no autocorrelation.

### **Heteroscedasticity Test**

The heteroscedasticity test is performed so that the confounding error is not constant on all independent variables. The heteroscedasticity test uses the Glejser test which is used to see if there is heteroscedasticity in the regression results. With the Glejser test, a probability chi-square value of 0.4564 is obtained, this value is greater than the real level of 0.05 so that it can be concluded that this model is free from heteroscedasticity violations.

### **Normality Test**

The normality test is used to see if the error term is close to the normal distribution because the data used is less than 30. The estimated result shown in the eviews 10 result shows that the probability value is 0.657. This value shows a result greater than the real level of 5 percent, which means that the error terms in the model are normally distributed.

### **Relationship of Structure and Factors Affecting Performance**

The results of the regression model in annex 7, show that the MES, CR4, X-eff, and JLP variables have a positive effect on PCM, while the PROD variable has a negative effect on

PCM. The relationship between PCM and independent variables is formulated with the following model:

$$\text{PCM} = 0.143 - 0.213 \text{ MES} - 0.143 \text{ CR4} + 0.251 \text{ X-eff} + 0.027 \text{ PROD} - 0.001 \text{ JLP} + \varepsilon$$

This means that an increase in MES of one percent will reduce PCM by 0.213 percent, which means that the more barriers to market entry increase, the greater the profitability will decrease. With increasing barriers to market entry leads to tougher competition as only strong industries can survive in the face of this market. A one percent increase in CR4 would reduce PCM by 0.143 percent.

In addition, an increase in x-eff by one percent will also increase PCM by 0.251 percent, this of course is supported by increasing efficiency, the benefits obtained will be even greater. Similarly, an increase in PROD by one unit will increase PCM by 0.027 percent. Productivity will support the performance of an industry, when productivity increases, the performance of an industry will also increase and when industrial performance increases, it can be interpreted as the more efficient the industry which leads to increased profits, this is what causes the value of PCM to increase.

The regression model also shows that of the five independent variables that exist, there are only two variables that have a real effect, namely PROD and X-eff. It can be concluded that the right regression model for the case of the skipjack fish industry is:

$$\text{PCM} = 0.143 + 0.251 \text{ X-eff} + 0.027 \text{ PROD} + \varepsilon.$$

The relationship between PROD and X-eff with PCM will certainly clearly affect each other because internal efficiency (x-eff) describes the ability of an industry to reduce its production costs, the more efficient the greater the benefits obtained and productivity (PROD) will maximize the effectiveness of industrial activities. It can be concluded that X-eff and PROD have a real effect and are in accordance with the hypothesis because industries will reduce production costs and maximize their productivity to keep paying attention to profits. These three insignificant variables such as CR4, MES, and JLP were considered incompatible with the initial hypothesis. Decreased. In the estimation model, the MES value has a negative effect on PCM, and in fact this MES value does not have a significant effect on PCM. This is thought to be because the high barriers to entry in the market will result in reduced competition in the industry.

The estimation model that designates productivity variables turns out to have a positive effect on PCM. This is in accordance with the hypothesis because the higher the productivity produced, it will increase profits in an industry. This is thought to be because high productivity will increase output or the goods produced also increase. As a result, the product becomes competitive and gives more profit. This condition can be said to be the reason why productivity has a real effect on PCM.

JLP which is defined as the number of companies has a negative influence on PCM. A one percent increase in JLP would reduce PCM by 0.001 percent. This increase indicates that the greater the number of firms supplying from an industry will reduce the profits of that industry. But in fact, the size of the JLP does not have a significant effect on PCM, because the more the

number of companies entering the market will reduce the profits that will be received from each company so that as a result the low profits will not support performance that is more interpreted in profit.

## CONCLUSION

The market structure of the skipjack fish industry in Banda Aceh is oligopoly as seen from the value of market concentration and barriers to entry from 2011 to 2020. During this time span, the structure of the skipjack fish industry also showed market concentration and barriers to entry that were getting lower in value from year to year. This shows that competition in the skipjack fish industry is increasing. The skipjack fish industry in Banda Aceh determines price strategies by following price rules made by outside parties such as United States importing countries, for product transactions are carried out by classifying products based on the size and type of product treatment such as fresh skipjack fish and frozen skipjack fish. In the performance dimension, it was found that the average PCM value for the period 2011-2020 was 33.88 percent with the largest PCM value occurring in 2018 at 44.33 percent and the lowest PCM in 2014 at 19.07 percent. Meanwhile, the average value on x-eff for the 2011-2020 period was 102.93 percent. The largest amount of internal efficiency occurred in 2019 at 147.99 percent, and the smallest x-eff value occurred in 2017 at 71.42 percent.

The independent variables that are considered to affect the dependent variable (PCM) are CR4, MES, X-eff, PROD, and JLP. However, only x-eff and PROD have a significant effect on PCM. The rest such as CR4, MES, and JLP have an intangible effect because the value is greater than the real level of 0.05.

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