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Market structure of abalone (*Haliotis asinina*) in Southeast Sulawesi, Indonesia

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Abstract. Abalone is one type of shellfish that has high economic value. This study aimed to assess market structure of abalone. The study was carried out in Bajo Bahari Village in Buton District, and Bau-Bau Municipality. Respondents consisted of 30 abalone catchers in the village, and three village abalone collectors (VACs) and two inter-island abalone traders (IATs) selected using snowball sampling method. Data were collected first in February 2015 and in May 2020 during Covid-19 pandemic. Data were analyzed qualitatively. Market structure was identified through assessment of the nature of competition based on the number of buyers and sellers, product differentiation, and entry and exit barriers. Study results showed that market structure exhibits oligopsony, in which the number of producers are more than that of village collectors, product differentiation is absent, and there exist some barriers to entry for village collectors. During Covid-19 pandemic, fishermen stop catching wild abalone, so there are still no more products to be marketed.

1. Introduction

The majority of shellfish (gastropods and bivalve mollusks) produced in Indonesia are still used for domestic consumption. A small portion of them has been exported, including abalone [1]. Abalone is one of the potential fisheries and marine resources in Indonesia [2,3], because of its high economic value [3-11]. This high price of abalone is due to a gap between supply and demand, reaching 40% [12]. Due to its high demand in the international market, the prospect for the development of abalone is highly promising [2,10].

Abalone in Indonesia is also known as “kerang mata tujuh” or “siput lapar kenyang [2,13]. People in Maluku call it “bia telinga”, because its shape resembles a human ear [2,9]. In the Philippines, abalone is referred to by several names as “lapas”, “sobra-sobra”, or “Kapinan” (Gallardo & Salayo 2003). Abalone is commonly found in eastern Indonesian waters [12]. There are seven species of abalone found in Indonesia [2]. Until now, abalone in Indonesia has generally been caught from its natural habitat in the ocean [1,5,7,11].



Abalone is a popular food [2,14]. The delicious abalone meat [5,6] lead to its high demand and price [15-17]. There are numerous potential and benefits of abalone, especially as food with high nutritional value [3], a distinctive taste, low cholesterol levels, and perceived benefits of increasing vitality. In Japan, abalone meat is believed to be able to cure kidney disease. Protein content of fresh abalone is high, namely 60.79% [18]. The nutritional value of abalone is quite high, namely 71.99% protein, 3.20% fat, 5.60% fiber, and 11.11% ash [19].

Abalone products can be consumed in several forms, namely fresh, simple processed, frozen, and canned [9,12,15]. Abalone is a product that has exotic value [4] with a high market value [2,20], especially in developed countries [9]. Abalone for some people is a prestigious food [21]. The biggest industries of farmed abalone are in China and Taiwan. Apart from being the main producers of farmed abalone, China and Taiwan are also major abalone markets [12,22,23]. Australia is one of the main abalone exporting countries in the world [24]. Abalone is also produced in Chile, Japan, South Africa, Australia, Taiwan, New Zealand, Mexico, Thailand and the Philippines [8]. Indonesia has just started farming abalone [11], including in Southeast Sulawesi [16]. Abalone farming has been tried in Kendari [10] although the business scale is still limited. This is not the case at the study location. The Bajo people in Bajo Bahari Village, Wabula District, Buton Regency have not yet cultivated abalone. All abalone traded are wild abalone harvested from the ocean around the village.

The current covid-19 pandemic phenomenon has had major consequences for abalone marketing due to shocks in both supply and demand. There are several studies on the economic, marketing, and benefits of abalone [8-10,16,17,22-25]. However, studies on the marketing of abalone are relatively limited compared to that of other aspects of abalone, such as its biology and culture system.

The residents of Bajo Bahari Village, located in the coastal area of Buton Regency, have long used fisheries and marines resources as a source of their livelihood. They have been aware of abalone as fisheries resources that have high market value, so that until the beginning of 2020 fishermen are still active in catching abalone. However, when the Covid-19 pandemic hit the world, all abalone catching activities suddenly stopped. Things are getting more complicated. It is not only related to the long distance between locations of consumers and producers, which requires the presence of marketing agencies that further lengthen marketing channel. However, at present, fishermen do not catch abalone, so there are no products to be marketed. Wild abalone marketing is under great uncertainty.

2. Materials and methods

The study was carried out in Bajo Bahari village, Wabula subdistrict, Buton District, Southeast Sulawesi. There were 30 fishermen who caught wild abalone in Bajo Bahari Village and all were taken as respondents. Other respondents were three village abalone collectors (VACs) and two inter-island abalone traders (IATs), which were selected using a snowball sampling technique. The IATs lived in Bau-Bau of Southeast Sulawesi from which they shipped abalone products to the buyers or exporters in Java. Data were collected first in February 2015, and then on May 2-6, 2020 during the Covid-19 pandemic. Data and information were analyzed qualitatively with a focus on assessing the market structure based on the number of marketing actors, product differentiation, and barriers to entry.

3. Results and discussion

Market structure shows market features that affect the nature of competition. In this study, the market structure was assessed from four aspects, namely, the number of sellers and buyers, product differentiation, barriers to entry, and the nature of competition. A summary of the research results on these aspects of abalone market structure is presented in table 1.

Table 1. Number of sellers and buyers, product differentiation, barriers to entry, and nature of competition in abalone market

No	Marketing actors	Number of persons	Product differentiation	Barriers to entry	Nature of competition	
					Sellers' perspective	Buyers' perspective
1	Fishermen	30	Nothing	No	Competitive	
2	Village collectors	3	Nothing	Yes	Oligopoly	Oligopsony
3	Inter-island traders	2	Nothing	Yes	Oligopoly	Oligopsony

3.1. Number of sellers and buyers

Abalone market participants consist of fishermen, village collector, and inter-island traders. Fishermen are producers who seek and collect wild abalone. The fresh abalone collected by fishermen are sold to village collectors. Village collectors process the fresh abalone into dried one. The dried abalone are then sold to inter-island traders who will ship and market the products to exporters in Java.

3.1.1. Fishermen. There were 30 abalone fishermen in Bajo Bahari Village. There were no restrictions to catch wild abalone. Every fisherman in the village is allowed to collect wild abalone from the sea. Based on the freedom to become abalone catchers, it can be said that fishermen are in a competitive position in marketing abalone. Competition between fishermen is in terms of the supply and sale of abalone. Individual fisherman does not have the ability to influence prices, because his catches are only a small part of the total catches traded in the village. This result is in agreement with the findings of [26] and [27] that a producer in a perfectly competitive market cannot influence market prices because he is only a very small part of the whole demand and supply system. This condition causes fishermen to act as price takers, even though abalone is a commodity that is widely exported and entered into international trade.

3.1.2. Village collector. From the buyers' perspective, the market faced by the three village collectors in the study village is oligopsony (few buyers and many sellers). In this condition, village collectors become the party who determines the price for fishermen. In the position of sellers, village collectors form an oligopoly market structure. The situation as an oligopolist causes village collectors to take the prices set by inter-island traders.

The people in the village fulfill their daily needs by making a living as fishermen. Therefore, not many of them were able to act as intermediaries. According to [26], there are several conditions that can lead to the oligopoly market structure, namely (1) the investment capital needed to become a collector is considered large by fishermen, (2) there is a special relationship between fishermen and collectors, and (3) the ability to control the market in the village.

3.1.3. Inter-island traders. Based on the number of marketing actors, the same market structure as village abalone collectors (VAC) is also seen at the inter-island abalone traders (IAT level). There were only two IATs, so that the market structure of IAT from the buyer's point of view is oligopsony. From the seller's point of view, IAT, which is an oligopolist, tends to be the party that receives the price (price taker) from the exporter which is the actor in the next level of marketing channels (not discussed in this study).

Inter-island traders in Baubau not only receive marine products from the study area, but also from other fishing areas. Of the two inter-island traders encountered at the time of the study, none of them dominated the purchase of abalone from Bajo Bahari village. Village collectors are free to sell their abalone products to one of the two inter-island traders.

3.2. Product differentiation

Product differentiation is the difference between one product and another in similar products. Product differentiation in this study is related to the nature of the product being traded. At the fishermen level,

there is no product differentiation. All fishermen sell homogeneous products, namely the fresh abalone catches, to village traders without removing their shells and feces.

Abalone is classified as a perishable commodity, so some processing technology is needed to add value or create form, time, place and ownership utilities of the abalone product. Processing can increase the selling price of abalone products as well. However, the condition that occurs in Bajo Bahari Village is that fishermen as producers sell fresh abalone soon after being caught, even though they know that the dried abalone has a higher price than fresh one. The main reason is that they need money as soon as possible, both to meet their daily needs and to pay debts to village collectors. If they carry out the processing, it will take some time to collect and dry wild abalone.

The homogeneity of the products sold by fishermen means that there are no options for the village collectors to prioritize abalone from one fisherman to another. The absence of product differentiation in a competitive market structure places fishermen as price takers. This is in accordance with the explanation of [28] that in a perfectly competitive market, a homogeneous product causes one product to be perfectly substituted.

Village collectors buy fishermen's catches by applying price standards based on the size of the abalone. Village collectors process the fresh abalone to become dried abalone which are then sold to inter-island traders. Similar to the condition at the fishermen level, there is no product differentiation at the village collector level. The product is homogeneous, namely dried abalone. The homogeneity of this product places village collectors in the position as price taker. Product homogeneity can also be seen in the products handled by inter-island traders who only market dried abalone products.

3.3. Barriers to entry

Barriers to entry are one measure of the market structure. High barriers to entry can reduce the opportunity for new potential competitor to enter the market. The level of barriers to entering the abalone market is determined by the ownership of capital, bond between marketing agencies, and special relations with certain marketing agencies.

3.3.1. Fishermen. For fishermen as producers, the way to enter the abalone market is to catch abalone. The supply of marketed abalone products depends on the number of catches from the ocean, so it is difficult to ensure certainty in the number and size of the product. In abalone catching activities, what is the most needed to become a fisherman is the knowledge of abalone, particularly their behavior, movement pattern, and habitat. In addition, fishermen must also have special abilities such as skills in diving and removal of shells from the reef or rock.

Catching abalone does not require financial capital or special fishing gear. Fishermen only need to have a boat without engine, which is a basic item that each Bajo household must own. Boats are used as a means of transportation to meet all the needs of the family outside the home. Boats are not only used for earning a living, but also for almost all activities outside the home, such as fetching water, washing clothes or going to the bath. The low cost incurred by fishermen to catch abalone means that anyone can enter abalone industry at the village level.

A free entry to become abalone catchers might also be related to the absence of catching regulation stipulated either by the government or by traditional rules in the village. In this regard, marine and coastal resources are still perceived as common property that is available for use to all (open access). This presumption of open access has brought about competition among fishermen to utilize the resources to maximize individual returns [29], which in turn could lead to depletion of resources. The decreased availability of abalone stock in the nature would directly affect the amount of wild abalone supply. In fact, the number of wild abalone catches shows a decreasing trend, which will have implication on the abalone marketing activities. During the Covid-19 pandemic, abalone marketing activities almost come to a halt since fishermen stop going to the ocean to catch abalone.

In the future, the government and stakeholders need to reduce the dependency on wild caught abalone by supporting abalone farming through aquaculture. Abalone farming activities have been initiated by the Gondol Marine Cultivation Center (BBL). Research on abalone hatchery has been

carried out since 2007, but the mass distribution of seeds could only be developed in 2010 [30]. Abalone farming should be encouraged, because world demand for abalone continues to increase.

3.3.2. Village collector. To enter and be involved in the abalone market, village collectors need initial capital to purchase fresh catches and then process and sell them to the next marketing actors. Capital is the main barrier to become village traders. Lack of capital is an important barrier for village residents due to their difficulty to access financial institutions.

All village traders said that the source of initial capital was their savings from abalone catches. Here it is noteworthy that VACs are also abalone catchers. Their profession as abalone catchers provides some advantages to perform their role as village traders. In addition to processing own catches to become dried abalone, the profession of abalone catchers enables them to understand more about abalone production. It also enables them to understand fishermen's daily life that facilitates the development of good relationship with them. This good relationship is not only due to kinship, but also to their assistance to fishermen who are in need of cash and daily necessities.

The presence of these ties is another barrier to enter abalone marketing at the village level. This bond mechanism is common in many fishing communities. Based on findings of Illouz [31] who conducted research on the Bajo communities in Kangean Islands, most of the people's living needs are met by having a debt. The only way for fishermen to get boats, fishing gear, and operational costs (such as fuel), is by going into debt. As a result, fishermen feel morally bound to sell their catches to traders who give them loans, or work as crew members of fishing boat of the concerned traders.

In Bajo Bahari village, it appears that there is a pattern of relationship based on such credit tying, although it is not as intense as those described in other areas. Fishermen are still free to sell their catches to any traders they want. With regard to the loan repayment mechanism, fishermen can choose to repay the loan with the catches, installments, or in full at once in a specified time.

3.3.3. Inter-island traders. Entry barriers to IATs are of the biggest magnitude in the wild abalone value chain. Becoming IATs requires large initial capital outlay to purchase a large quantity of dried abalone from many catching areas and ship them to the buyer or exporter in Java. They must establish and maintain mutual trust with village collectors as well as processors and exporters outside the province. They should have good networking and strong skills to perform several marketing functions.

3.4. Nature of competition

The nature of competition among the market participants is influenced by the number of seller and buyers, product differentiation, and entry barriers. The nature of competition shown by fishermen is a competitive market. Such competitive nature of the market can be seen from the number of fishermen accounting for 30 people, the product being homogenous, and the absence of barriers to entry. Individually, fishermen as producers cannot determine prices. They are price takers. This nature of competition is in accordance with what [26] states that several characteristics of a perfectly competitive market include many sellers and buyers, homogenous products, free entry into the market, and inability to control prices. This market characteristic only exists in agricultural production [26].

The nature of market competition shown by village traders and inter-island traders is oligopsony from the buyer's point of view and oligopoly from the seller's point of view. From the buyer's viewpoint, the oligopsony characteristic can be seen from the smaller number of intermediaries, namely three VACs and two IATs compared to the number of fishermen who totaled 30 people. Being few in number, VACs and IATs have a significant role in determining the price of the product (price maker). The small number of traders selling dried abalone products is due to barriers to entry into abalone intermediaries, namely large initial capital outlay and special bond with fishermen. The position of the seller who markets homogeneous products in a market with a limited number of buyers and sellers, causes each village collector to act as a price taker.

Overall, the market structure shown in the abalone market between fishermen as sellers and collectors as buyers refers to the oligopsony. In this study, the number of fishermen as producers is

more than the number of collectors. This result corroborates the findings of [32] and Lilimantik [33] regarding the oligopsonistic market structure. In this regard, their assessment of oligopsonistic market is based on the three main criteria, namely (1) the number of producers is more than that of collectors, (2) the absence of product differentiation, and (3) the existence of barriers to entry into intermediaries in the market.

4. Conclusions

Based on the results and discussion, it can be concluded that (i) the marketing actors consisted of 30 fishermen, three village traders, and two inter-island traders, and (ii) the nature of competition in the abalone market exhibits oligopsony. The government and stakeholders need to pay attention to abalone development, particularly in providing education and training on abalone cultivation and processing to fishermen. Empowerment activities for fishermen and other market players will have an effect on fishermen's market power and lead to a more balanced market structure.

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