ABSTRACT

Econometric Model of The Indonesian Fisheries: A Policy Simulation Analysis on The Trade Liberalization Era

Soepanto. Econometric Model of The Indonesian Fisheries: A Policy Simulation Analysis on The Trade Liberalization Era (Advised by Kuntjoro as coordinator, Bonar M. Sinaga, Bunasor Sanim, Tridoyo Kusumastanto, and Ato Suprapto as members).

During the Second Long-Term Development Plan, fishery sub-sector is expected to play as a new growth engine that can be realized through increasing export and sub-sector contribution to agricultural GDP and providing more employment opportunity. These objectives, however, are not easy to be obtained providing that fisheries are dominated by small-scale firms using simple technology and their products have local market orientation. Furthermore, some waters have been fully exploited. If they are still under-exploited, lack of infrastructure hinder the optimum utilization of the resources.

In the market liberalization era which will be characterized also by higher awareness on environmental issues, foreign investors will enter Indonesian fishery. If there are no proper management and regulation, there might exist conflict between labor intensive-small-scale fishery and capital intensive-industrial fishery. Therefore, problems likely faced by the Indonesian fishery in the trade liberalization era are: (1) Can Indonesian fishery products compete in international market since its competitors and trading partners will remove their trade barriers; (2) How will be the impact of the trade liberalization on the sustainability of fish resources, (3) What policies must be addressed by which fishery can be a new source of growth especially in the aspects of export value, GDP, and employment opportunity.

The objectives of this study are: (1) to formulate and econometric model of Indonesian fishery that can explain relationships between supply, demand, and price by
integrating domestic and international markets, (2) to analyze export performance and the competitor of fishery product, (3) to assess the impact of trade liberalization on sustainability of the fish resources, and (4) to formulate alternative policies to increase export, employment, and fishery GDP.

Model developed in this study is an econometric model by disaggregating fish by species, production areas, export destinations, and processing technologies. The model incorporates exogenous factors representing domestic and international as well as policy intervention variables. There are 11 fishing areas, 7 fishing gears, 6 types of brackishwater ponds, and 3 group of fish species namely tuna, shrimp, and others. The three species are marketed in fresh, frozen, and canned to the USA, European countries, and other Asian countries. In each export destination, competitors, non-competitors, and alternative markets are considered.

Model estimations show that 5 of 11 tuna fishing grounds can be best described in quadratic functions. The grounds are Western Sumatera (W1), Southern Java (W2), Malaka Strait (W3), Eastern Sumatera (W4), and Northern Sulawesi (W10). The remaining areas are best fitted with linear functions and they all are positive response to purse-seiners and hand liners, except Maluku - Irian Jaya (W11) that has negative response to purse-seiners and Southern Bali (W6) that has the negative response to hand liners. The results also show that for shrimp fishery, 4 areas that can be described by quadratic functions are Southern Java (W2), Eastern Sumatera (W4), Northern Java (W5), Western and Southern Kalimantan (W7), and the rest of the areas are best explained by linear function. All areas have positive response to shrimp net (PU), trammel net (PK), and fish net (JI), except for Western and Southern Kalimantan (W7), Eastern Kalimantan (W8) that have negative response on trammel net and fish net. Moreover, the areas of Southern - Western Sumatera (W1) Northern Java (W5), and Southern Bali/NTT (W6) have negative response to shrimp net. The production functions of aquaculture
shrimp are expectedly and best explained by input price, output price, and other supporting variables.

Fresh, frozen, and canned shrimp and tuna are exported to 19 countries. Overall, export demands are price inelastic except for canned tuna to Japan and the USA. Export of frozen shrimp to the USA has short and long run price elastic. Export of canned tuna to Europe has price elastic in the long run.

The competitors for fresh tuna are Taiwan and Korea; for frozen tuna are Spain, Korea, and Thailand; for canned tuna are the Philippines and Thailand. The competitors for fresh shrimp are Thailand and China; for frozen shrimp are Thailand, China, and India. In the trade liberalization unilateral era, growth of Indonesian tuna and shrimp export will be higher than its competitors. By considering elasticity and growth, tuna and shrimp will be able to compete in the trade liberalization era.

Fish resources are said sustainable if their supply curves have positive slope and not sustainable if the curves are negative slope. At the condition of economic crisis and the trade liberalization, all supply curves have positive slope, but some areas have negative slope for tuna in Malaka Strait (W3), Eastern Sumatera (W4) and for shrimp in Southern of Java (W2) and Southern – Western Kalimantan (W7). Hence, it could be concluded that in the trade liberalization era fisheries resources and their supply would be sustainable, except some areas are not sustainable.

At economic crisis (Kris-Ek), normal liberalized condition (R-Norm), and crisis liberalized condition (LKE), Indonesian fishery would generate profit although world price decreased but domestic price increased. As a result, production increased (percentage growth of aquaculture shrimp would double the growth of tuna) that raised tuna and shrimp export, except canned products. The ultimate result would increasing of export earnings (RINXIK), fishery GDP (GDPAGI), and employment.
Lower price of ice and cold storage rent (Agroprocessing Policy) tend to increase the export of frozen and canned products, export earnings, and fishery GDP but to decrease export of fresh products and employment. These negative impacts could be overcome by increasing number of boat and brackish water pond areas (Production Policies). These Policies, however, require more public funding and low interest rate (Fiscal/Monetary Policy).

If these policies have been taken place but then GDP of Japan decreases by 5%, export earnings will reduce by 0.798% and fishery GDP decline by 0.794%. Without the policies, the impact of lower GDP of Japan will be one and half. Therefore policies that should be undertaken at trade liberalization era are the sinergistic of fiscal, production, and agroindustrial policies. In addition, interest rate should be reduced to its levels prior to the crisis. Fiscal policy that should be taken is to increase public funding, and policies of real sector one to increase number of boat and shrimp pond areas. The Agroindustry policies that should be taken one to lower ice price and cold storage rent.

The econometric models developed in this study can be used to: (a) describe performance of production, domestic and international prices as well as their effects on Indonesian fishery, (b) identify export demand markets and their alternatives as well competitors countries, (c) analize various policy alternatives needed to develop Indonesian fisheries.

The results of the analysis indicated that fishery should be developed because it can increase export earnings, fishery GDP, and employment opportunity. To arrive at these results, trade liberalization should be followed. To anticipate lower price at the liberalization era, non-tuna and shrimp commodities need to be specified. The goverment should reduce interest rate, extensity shrimp pond areas, and increase number on fishing boat and fishing gear. At the same time, agroindustry should be developed by reducing ice price and cold storage rent and supported by proper public spending. The increase in
number of boat should be done in the areas whose response boat fishing gear scale are positive. Thereby, fishing will be feasible and research aspect that should be considered in the future is specification of boat size and gear scale in every area as bases to formulate right policy instruments. Because Indonesia has been depended so much on Japanese market, there should be a research to understand other markets too. Also, export performance of non-fish and shrimp should be further studied.