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AN ECONOMETRIC ANALYSIS OF THE JAPANESE DEMAND FOR INDONESIAN TUNA

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By

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LIST OF ABBREVIATIONS

ADB	: Asian Development Bank
CIC	: Capricorn Indonesia Consultant Inc
EEZ	: Economic Extended Zone
FAD	: Fish Aggregating Device
FAO	: Food and Agriculture Organization
JETRO	: Japan External Trade Organization
MSY	: Maximum Sustainable Yield
PIR	: Perikanan Inti Rakyat
REPELITA	: Rencana Pembangunan Lima Tahun
TPI	: Tempat Pelelangan Ikan

Abstract of thesis submitted to the Senate of Universiti Pertanian Malaysia in partial fulfillment of the requirements for the degree of Master of Science.

AN ECONOMETRIC ANALYSIS OF JAPANESE DEMAND FOR INDONESIAN TUNA

By

YUARY FARRADIA

June 1995

Chairman: Dr. K. Kuperan

Faculty: Economics and Management

The objective of this study was to evaluate the Japanese demand for Indonesian tuna. Tuna which consisted of two species (Yellowfin and Bigeye) were observed in terms of fresh and frozen form at two price levels. Secondary data were collected from the institution as related to tuna information as well as references. In addition, interview with experts in tuna was also conducted. The data were then analysed using 2SLS method to construct a demand model.

Tuna market in Indonesia is mostly controlled by four state owned companies. The marketing channel starts with fisherman and ends with the broker or exporters. However, some companies exported tuna directly or indirectly. The price of tuna export follows the international price in Japan, which is determined by a grading system based on 'torro' content and freshness.

Statistical analysis using 2SLS shows a relationship among tuna species in terms of fresh and frozen forms at low and high price, respectively. The Japanese

demand for fresh yellowfin in general, is determined by its previous demand, its own price and per capita income. However, at low price level, it is also determined by price of frozen yellowfin and price of shrimp; whilst at high price level, fresh yellowfin is determined by price of fresh bigeye.

The Japanese demand for fresh bigeye at low price level is determined by its previous demand, its own price, price of frozen bigeye, price of shrimp and per capita income which has negative sign. For high price level, fresh bigeye demand is determined by its previous demand, its own price, price of shrimp and per capita income.

The Japanese demand for frozen bigeye at low price is determined by its previous demand, its own price, price of frozen yellowfin and price of shrimp. However, for high price level, it is determined by its previous demand, price of shrimp and per capita income, which has negative sign.

In terms of elasticity, price elasticity for the overall tuna species in this study is inelastic. Income elasticities are, however, elastic.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi sebahagiaan daripada syarat untuk Ijazah Master Sains

SUATU ANALISIS EKONOMETRIK PERMINTAAN JEPUN UNTUK TUNA INDONESIA

Oleh

YUARY FARRADIA

June 1995

Pengerusi : Dr. K. Kuperan
Fakulti : Ekonomi dan Pengurusan

Tujuan kajian ini adalah untuk meninjau permintaan Jepun untuk ikan tuna Indonesia. Tuna yang dikaji mengandung dua jenis species ikan tuna ('yellowfin' dan 'bigeye') dalam bentuk segar dan beku yang mempunyai dua tingkat harga. Data sekunder dikumpulkan dari institusi-institusi yang berhubungan dengan maklumat mengenai ikan tuna dan rujukan lainnya. Temubual dengan pakar-pakar tuna juga telah dilakukan. Data dianalisis dengan menggunakan metode 2SLS untuk membentuk suatu model permintaan untuk ikan tuna Indonesia di negara Jepun.

Pada amnya, pasaran tuna di Indonesia dikuasai oleh empat buah perusahaan kerajaan. Saluran pasar dimulai daripada nelayan, dilanjut- kan ke perantara atau pengeksport. Akan tetapi, perusahaan boleh dapat mengeksport tuna secara langsung ataupun tidak langsung. Harga ikan tuna eksport adalah mengikut harga antarbangsa di Jepun yang ditentukan oleh suatu sistem seleksi yang berpedoman kepada kandungan 'torro' dan kesegaran ikan.

Analisis statistik yang menggunakan 2SLS memperlihatkan perhubungan daripada beberapa jenis tuna segar dan beku pada masing-masing tingkatan harga rendah dan tinggi. Pada amnya permintaan Jepun untuk ikan 'yellowfin' segar mempunyai pengaruh daripada permintaan pada masa lalu, harga daripada ianya dan pendapatan per kapita. Pada harga rendah, ia juga dipengaruhi oleh harga 'yellowfin' beku dan harga udang. Sementara pada harga tinggi, ikan 'yellowfin' segar dipengaruhi oleh harga ikan bigeye segar.

Permintaan Jepun untuk ikan 'bigeye' segar pada harga rendah mempunyai pengaruh ke atas permintaan ianya pada masa lalu, harga ianya sendiri, harga 'bigeye' beku dan udang dan pendapatan per kapita, yang mana ianya mempunyai tanda negatif. Pada harga tinggi, ikan 'bigeye' segar mempunyai pengaruh keatas permintaan ianya pada masa lalu, harga ianya sendiri, harga udang dan pendapatan per kapita.

Permintaan Jepun untuk ikan 'bigeye' beku pada harga rendah mempunyai pengaruh ke atas permintaan ianya pada masa lalu, harga ianya sendiri, harga ikan 'yellowfin' beku dan udang. Akan tetapi, pada harga tinggi, ia mempunyai pengaruh ke atas permintaan ianya pada masa lalu, harga daripada udang dan pendapatan per kapita yang ianya mempunyai tanda negatif. Keanjalan harga untuk semua jenis tuna adalah tak anjal. Keanjalan pendapatan adalah anjal.

CHAPTER I

INTRODUCTION

Indonesia is the largest archipelagic nation in the world, consisting of more than 17,000 islands and 82,600 km^2 of coastline. The seas surrounding Indonesia cover two major continental shelves, i.e the Sunda and the Sahul - shelves with an area of about 775,000 km^2 (ADB, 1993). In addition, there are also large areas of inland open waters. One of the natural resources which can be exploited from the seas and inland waters is fish.

Fishery products are all kinds of fish gathered from the seas and inland waters, including products processed with simple methods (dried and salted fish). The data on quantity and value of production can be seen in Tables 1 and 2.

Table 1

Fisheries Production, 1987-1992
(thousands of tons)

Source	1987	1988	1989	1990	1991	1992
Sea	2017.4	2169.6	2272.2	2370.1	2505.0	2647.0
Inland	653.1	711.6	765.0	792.4	807.0	821.2
Salted fish	626.9	590.7	660.4	725.8	797.6	876.5

(Source: Central Bureau Statistic of Indonesia, 1993)

Table 2
Fishery Output at Current and 1983 Constant Market Prices
(billion rupiahs)

Source	1987	1988	1989	1990	1991	1992
At current market prices :						
Sea	1242.7	1483.1	1737.9	1912.2	2178.9	2436.5
Inland	875.3	998.8	1186.6	1302.6	1448.9	1579.7
Salted fish	615.9	639.7	841.9	971.2	1126.1	1327.8
Total	2733.9	3121.6	3766.4	4186.0	4753.9	5344.0
At 1983 constant market prices :						
Sea	825.7	888.0	930.0	970.0	1025.2	1083.6
Inland	568.4	619.4	665.8	690.2	702.4	714.8
Salted fish	454.3	428.1	478.7	526.0	578.1	635.3
Total	1848.4	1935.5	2074.5	2186.2	2305.7	2433.7

(Source: Central Bureau of Statistics, 1993)

The latest data from Central Bureau of Statistics (1993) on the Indonesian economy showed an increase in gross domestic product of 6.29% (at 1983 constant market prices). This rate of growth was a little lower than the proceeding year's rate of 6.90%. Export performance in 1992 was as follows. Oil and gas exports in US dollar decreased by 2.1%, while non-oil and gas exports increased by 27.7%. The fishery sub-sector as a part of non-oil and gas sub-sector increased by 5.08%.

Indonesian fishery development policy emphasizes increasing exports and decreasing imports of fishery products. Consequently, during 1987 - 1991 export of fishery products increased by 30.76% per annum, (140,378 mt in 1987 as compared to

409,043 mt in 1991). In terms of value, the increase was 28.10% per annum, from US$ 475,523 million to US$ 1,255,663 million during the same period (see Figure 1 and Figure 2). Shrimp and tuna /skipjack are important contributors to the total export. Other fishery commodities are fresh/chilled, frozen and canned fish, frog legs, jelly fish, sea weed, coral and other shells, fat and oil fish, ornamental fish, snail, shrimp, crackers and pearls.

Statement of the Problem

Tuna is an important source of income for Indonesia after shrimp. It is exported mainly to Japan, The United States of America, Europe and other Asian countries (Thailand and Taiwan). Indonesian tuna has the capability to compete in the international market due to its resource availability as well as its quality. However, its contribution to international world market remains small at only about 4.67% in 1989. Furthermore tuna share in the world import is still relatively low (3.4% of total world imports) (Martono, 1991).

Japan is a potential market for Indonesian tuna. About 9.8% of Japan's import of tuna is from Indonesia, which is equivalent to 90% of Indonesia's export of big tunas (fresh and frozen). Consequently, this high volume of tuna export to Japan have made Indonesia too dependent on Japan. On the other hand, although Indonesian tuna has a lower price fluctuations are found in the tuna export market (Figure 3). For instance, the price of exported tuna to Japan between August and October 1993 decreased by up

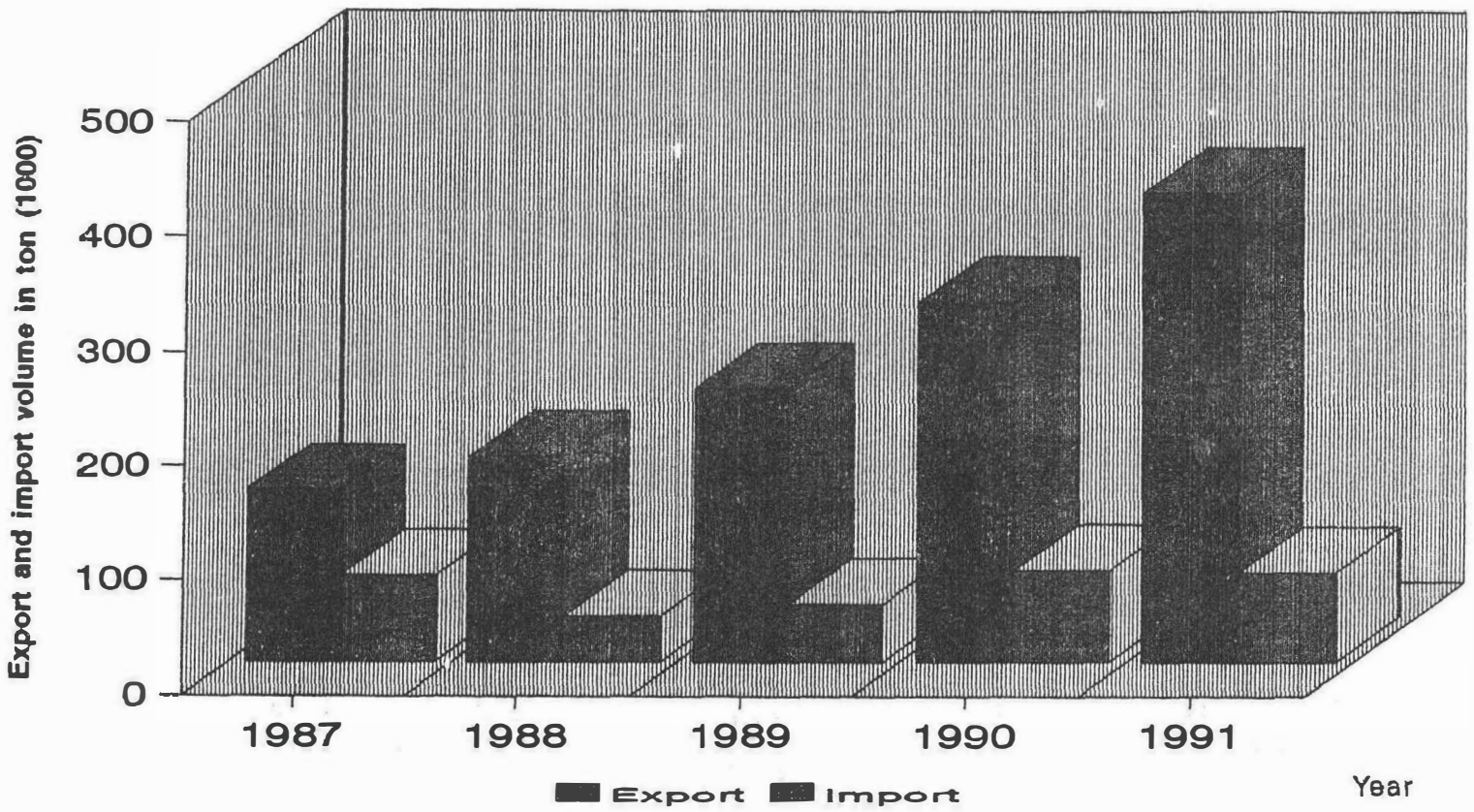

Figure 1

Export and Import Volume of Fisheries Production 1987 - 1991

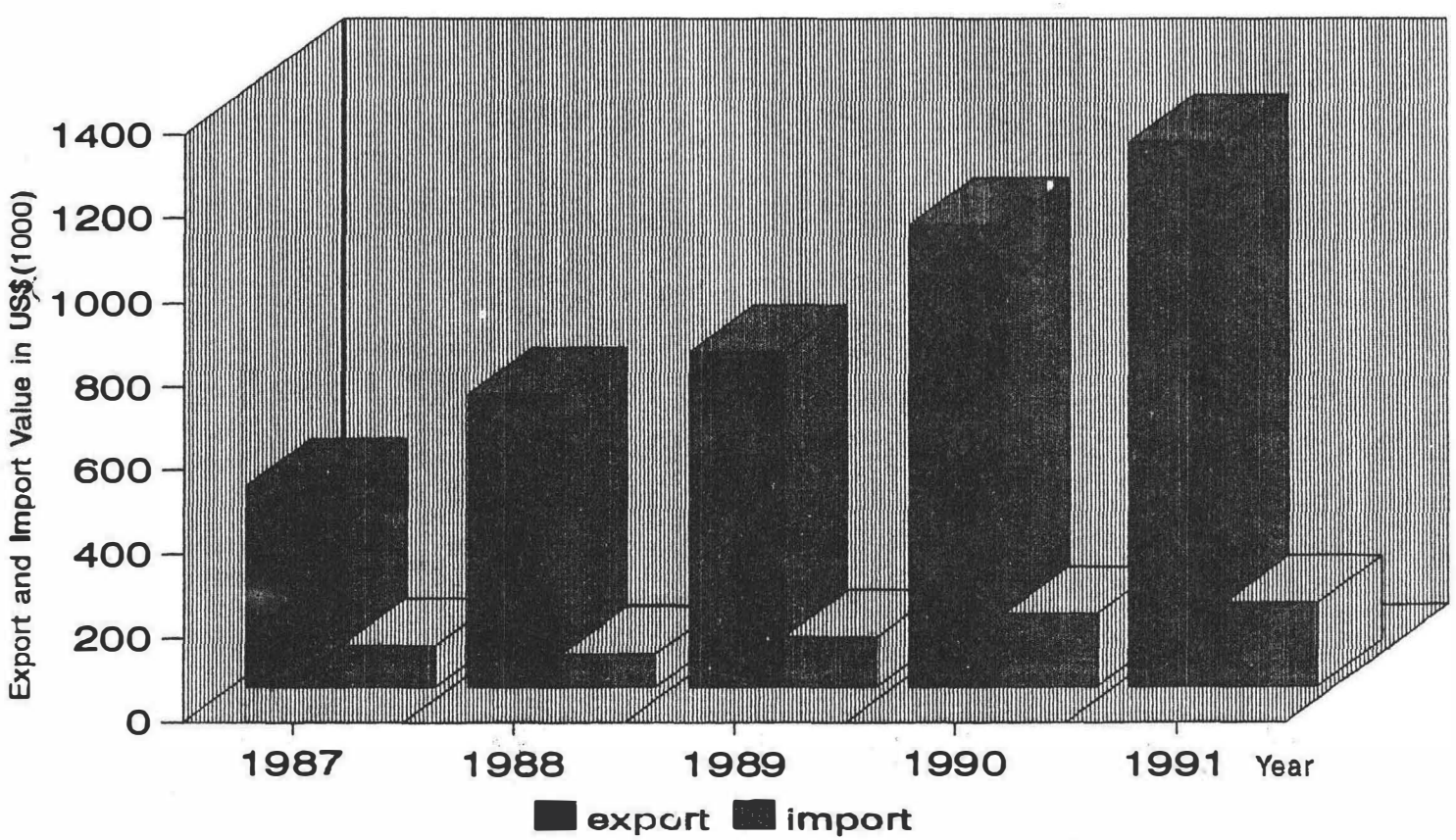

Figure 2

Export and Import Value of Fisheries Production 1987 - 1991

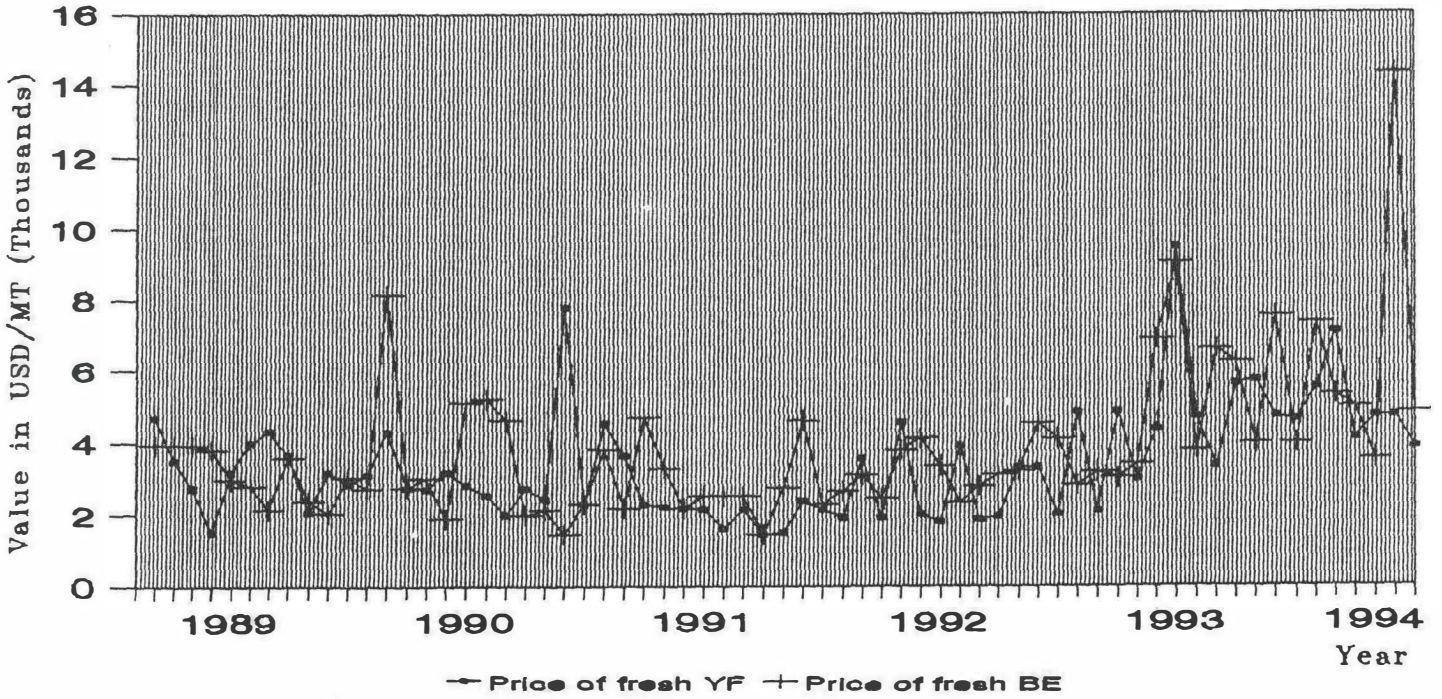

Figure 3

Price Fluctuation of Fresh Yellowfin (YF) and Bigeye (BE)

to 50%. (Tempo, 1993). Since Indonesia is dependent on Japan's market, it is imperative to understand Japan's market behaviour. Hence there is a need to understand the Japanese demand for Indonesian tuna as a basis for better management of the tuna trade.

In addition, due to the government policy and abundant resources of tuna, and comparative advantage in terms of cost and production, Indonesia is interested in increasing tuna exports, in particular to Japan. Therefore a better understanding of the export demand for tuna by the Japanese will help the government to plan and formulate effective policies for tuna trade.

Significance of the Problem

Indonesia like most developing countries is trying to increase the exports of non-oil and gas commodities to countries such as Japan, USA, Europe and other Asian countries. Fisheries products are one of the important non oil and gas export commodity which can be used to increase foreign exchange and national income.

Increasing the production and export of fishery commodities is often seen as an important activity for helping the rural poor and in achieving economic growth. This is based on the fact that the level of fisheries resource exploitation is generally low, about 30 - 55% of the natural resource potential (Naamin and Hardjamulia, 1990).

One of the exported fishery commodities which has good prospects for earning foreign exchange is tuna. Based on both the resource availability and cost of production, there is good potential for further development in tuna trade. Tuna is abundant in the adjacent areas of Indonesian waters throughout the year. Cost of production of tuna, is relatively cheap compared to other tuna exporters in the region, especially in terms of labour cost. Labour costs in the tuna industry is cheap with a wage rate of about US $ 1.50 per day. Therefore, Indonesia has a comparative advantage over the other countries in the development of the tuna industry.

Another important evidence of the potential for developing the tuna industry is the increase in the volume of Indonesian tuna exports in the international market. Indonesian tuna exports have been able to penetrate markets in Japan, USA, and Europe (particularly fresh tuna).

Another important aspect of Indonesian's development strategy is to increase the marketing efficiency of fishery products. Market information, networks and intelligence are important ingredients for improving market performance (Suparno *et al*, 1992 and Putro and Artaty, 1992). This study on the export demand for tuna hopes to generate useful information for the further understanding of the tuna trade.

Objectives of the Study

The overall objective of the study is to analyse the Japanese demand for Indonesian tuna and its prospects for the Indonesian economy. The specific objectives are:

1. to examine the Japanese demand for Indonesian tuna.
2. to describe the marketing channels and practices of tuna exports.
3. to estimate the export demand equation and obtain price elasticities for Indonesian tuna.
4. to provide some policy options for developing the tuna trade