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Analysis of Turkey's import demand of fishery products

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In this study, economic factors which are effective upon the import demand of fishery products in Turkey were studied. Import demand of fishery products in Turkey is affected by the world prices, agriculture programs and policies of the governments. Turkey's import demand of fishery products was approached as a function of domestic prices, per capita income, lagged amount of import (t-1), exchange rate of the US dollar (USD)-Turkish lira (foreign exchange rate) and the factor of trend. Parameters were estimated with regression analysis. The study is a time series analysis and the data include the period between 1996 and 2008 and they are annual. Consequently, while the gross national product, domestic real prices, exchange rate of dollar and lagged import variable were found statistically significant among the factors that affect the analysis of Turkey's import demand of fishery products, trend factor was not found statistically significant.

Key words: Fishery products, econometrics, import, demand, Turkey.

INTRODUCTĐON

A graduated change has occured on the consumption parity of Turkey's foodstuff, especially after 1996. This condition could easily be observed on developments which have occured during the last 16 years, especially on the agricultural product import (Karkacier, 2000). Considering the import of fishery products, which constitute the one-down branch of the agricultural sector, it is known that a prominent increase has emerged after 2001.

The import of fishery products, which was 34072.89 (000$) in 1996 increased to 11517.24 (000$) in 2001 and finally, to 119768.84 (000$) in 2008. The import of fishery products has increased 3.52 times during the last 13 years. The increase in the import of per capita fishery products was recorded as 1.69 times. According to the data of 2008 in Turkey, while the greatest share among the consumption expenditures of the family revenue belongs to the house expenditures (29.1%), food expenditures (22.6%) are ranked number two and this is followed respectively by transportation expenditures (14.1%), houseware (5.8%), clothing (5.4%), communication (4.4%), hotel, restaurant, patisserie (4.4%), culture-entertainment expenditures (2.5%), educational services (2.0%), health expenditures (1.9%),

and other expenditures (8.2%) (Turkstat, 2009). Considering the per capita consumption of foodstuffs in Turkey and in the world, we see that very interesting results have occured in terms of Turkey. While the per capita consumption amount of animal foodstuffs is low in Turkey, the consumption level of vegetable-origin foodstuffs (cereals, vegetable, fruit, pulse, potato, etc.,) is above the value that is determined for a great deal of developed countries (Karkacier, 2000). Additionally, while the consumption amount of foodstuffs for Turkey shows a prominent increase within the research period, no decrease has been determined in terms of the consumption of fishery products. While the amount of per capita fishery products was consumed as 8.6 kg annually in 1996, this number regressed to 7.8 kg in 2008 (Turkstat, 2009). The average consumption amount of fishery products in Turkey, which is annually 7.8 kg, is considerably less compared to the average of EU countries, which is 22.0 kg/year and the average of the world, which is 16.0 kg/year (FAO, 2008). According to these detected results, it could conveniently be said that the consumption amount of the fishery products in Turkey is considerably behind the developed countries.

The import and export values of Turkey's fishery products sector are as given in Table 1. Accordingly, the import value of Turkey's fishery products consideraby decreased, due to the economic crisis and devaluation that occured in the country in 2001, however, it has distinctly increased since 2002.

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Table 1. Foreign trade of Turkey's fishery products by years (Turkstat, 1996-2008).

Years	Import of fishery products		Export of fishery products		Domestic consumption	
	Value (1000$)	Index	Value (1000$)	Index	Value ($)	Index
1996	34072.89	100	55195.61	100	1.027	100
1997	50836.36	149	68206.91	124	1.128	110
1998	40558.11	119	39986.46	72	1.370	133
1999	29408.24	86	61547.29	112	2.126	207
2000	37022.93	109	46401.63	84	3.383	329
2001	11517.24	34	54513.74	99	6.323	616
2002	18754.78	55	103057.17	187	7.090	690
2003	32636.12	96	124842.22	226	7.012	683
2004	54240.30	159	180513.99	327	7.960	775
2005	68558.34	201	206039.94	373	7.022	684
2006	83415.01	245	233385.32	423	8.611	838
2007	96632.06	284	273077.51	495	7.859	765
2008	119768.84	352	383297.35	694	7.112	693

Although there is no study related to the import demand analysis of fishery products in Turkey, there are some important studies on the import demand of different agricultural products. These studies could chronologically be summarized as follows; Karkacier (2000) analysed the effects of the economic factors on the import demand analysis of Turkey's dairy products. Finding an econometric model for Turkey related to fishery products consumed in Izmir and its provinces, Senol and Saygi (2001) carried out an initiator study. Hatirli et al. (2002) examined the factors that affect the import demand analysis of Turkey's soybean and sunflower oil. Goktolga (2006) examined the economic factors that affect the consumption of meat and meat products in Turkey. Kizilaslan and Kizilaslan (2006) tried to determine the factors that affect the import demand analysis of oil and oil products industry. Uzunoz and Akcay (2009) on the other hand, examined the factors that affect the import demand of wheat in Turkey.

The studies that were carried out by the researchers of other countries outside of Turkey, related to the same subject, belong to the following researchers: Lordkipanizde et el. (1996), Tanyeri-Abur and Rosson (1996), Satrayanarayana et al. (1997), Miljkovic et al. (2002), Schmitz and Seale (2002), Ramirez et al. (2003) Tang (2003) Andino and Kennedy (2004), Grethe (2004), Narayan and Narayan (2005), Agbola and Damoense (2005), Fosu and Magnus (2008), Kee et al. (2008) and Yazdani et al. (2008).

All these studies show that the import demand analysis of both animal and vegetable foodstuffs is an important study item. Moreover, the fact that there is no detailed study about the import demand of fishery products in Turkey is very important in terms of determining the factors that affect the import demand of fishery products that has been the issue in recent years in Turkey. Accordingly, this study was aimed to examine the factors that affected the import demand of fishery products during the period of 1996 to 2008 with an econometric model. We expect that the import demand function, which has been found, will help all the researchers who deal with the sector of fishery products.

MATERIALS AND METHODS

The period that was analysed in this study, includes the years between 1996 and 2008. Until the early 1980s, Turkey had a fairly closed economy. At that time–as part of more wide-ranging economic reforms – the trade policy of protection and import substitution was replaced by a much more open trade regime (Togan, 2005; Uzunoz and Akcay, 2009). The reason of taking 1996 is that; considering the foreign trade numbers between Turkey and the European Union (EU), the commerce has depicted a distribution on behalf of import after the customs union (CU), despite the constant increase in Turkey's export to the EU. The basic reason for this condition is that Turkey has gained the right of duty-free entrance into the EU market, concerning the industrial products unilaterally, except for some exceptions as from 1971 and that EU gained this right in 1996. Customs union has become effective in increasing the total trading volume of Turkey. EU has always had a very significant share in Turkey's foreign trade; while this rate was 48% before the CU, it remained the same after the CU and then reached the rate of 50% (Aktas and Yilmaz, 2008).

In this study, regression analysis was applied to the time series analysis, in order to find the import demand model. In many studies on this subject, double logarithmical linear function was generally preferred for the selection of the function type. Therefore, Double-Log-Linear type of function was preferred in the study.

Response model was discussed. Turkey's import demand for fishery products is specified as domestic prices, gross national product per capita, exchange rate of the US dollar (USD)-Turkish lira, lagged import and trend factor.

The response model is expressed as follows:

$$ID_t = f(GNP_t, PF_t, EX_t, ID_{t-1}, T)$$

The explanation of the variables on the empirical model equation is given in Table 2.

Table 2. Definitions of model variables for Turkey's import demand of fishery products.

Variable name	Variable definition
ID_t	The variable represents import demand value of fishery products (1000$)
GNP_t	The variable represents gross national product per capita ($)
PF_t	The variable represents real domestic prices of fishery products (2003=100 index was used for exchange real prices)
EX_t	The variable represents the exchange rate of the Turkish lira – US dollar (TL/USD)
ID_{t-1}	The variable represents import demand value of fishery products for previous year (1000$)
T	The variable represents trend factors (1, 2, 3, …13)

Table 3. Parameters and statistical tests concerning the equation of Turkey's import demand of fishery products.

Parameter	Coefficient	Standard error	t- ratio	p- value
Constant	-4.047	0.692	-5.848	0.001
GNP_t	3.144	0.352	8.930	0.000
PF_t	-0.396	0.122	-3.248	0.014
EX_t	0.154	0.199	0.771	0.466
ID_{t-1}	-0.272	0.100	-2.734	0.029
T	-1.122	0.360	-3.115	0.017
R-Square	0.978			
R-Square (Adj)	0.962			
F	60.957			
DW	1.782			

RESULTS AND DISCUSSION

Parameters and statistical results related to the estimated import demand equation of fishery products are given in Table 3. The results are the time series of 1996 to 2008 and are related to Turkey's import values of fishery products.

The determination coefficient (R-square) of the estimation function is 0.978 and 97.8% of the change in the import demand model is explained by the model, by means of the variables that were included in the model. The multi adjusted determination coefficient (adjusted R-square) of the function is 96.2%. The significance of the estimation function as a whole was determined by the F test. The calculation value of F is 60.957 and it is significant on the significance level of 1%.

However, the Durbin-watson statistic test was controlled, whether or not there was an autocorrelation on the time series. Additionally, due to the use of the time series analysis, the lagged variable in the model requires the testing of the presence of the serial correlation (Gujarati, 1995). DW statistic calculation value of the import demand equation is 1.782 and it was found that there was no positive or negative autocorrelation on the significance level of 5% (DW calculation = 1.782, k = 5, n = 13, critical values are: dl = 0.294 - du = 2.150 and dl < DW < du).

Parameters, regression coefficient, standard errors, t-ratio and p-value (significance level) of each of the import demand variables are given in Table 3.

The share of the fishery products within the food expenditures among the consumer expenditures can not be denied, therefore, the coefficient of price and income variables in the import demand model is expected to be great. As is seen in Table 3, the income flexibility of GNP_t is 3.144 on the analysed time series, and it is positive; besides, the unit could be claimed to be flexible. This means that the increase of the flexibility income is evenly reflected on the amount of the import demand, in other words, an increase of one unit on the incomes would create an increase of one unit on the amount of the import demand, as well.

The coefficient of the variable of Turkey's import prices index was calculated to be negative and 0.396. This result shows that a possible increase in the domestic prices of import goods would create a negative effect on the import. In case the prices increase for one unit, the import will decrease for a unit of approximately 0.396.

The ID_{t-1} coefficient of the import demand amount variable of the previous year is negative and smaller than 1, its flexibility coefficient is -0.272. This means that the demand of the previous year has a negative effect upon the demand amount of the current year.

The variable of EX_t represents the exchange rate of the

Turkish lira–US dollar (TL/USD) and it is seen that it is not statistically significant upon the import demand amount of the fishery products.

The last variable on the model is the trend factor. The coefficient of the trend factor (1, 2, 3, …, 13) is negative (-1.122). This factor reflects the change on the tastes and preferences of the consumers. The fact that the coefficient is negative shows that there is a decline in the import of fishery product preferences of the consumers or in other words, the preferences are on the side of the domestic products. It is known that import of fishery products are not preferred by many people, in terms of flavour, aroma and tradition (Saygi and Hekimoglu, 2011).

According to the calculated results and in reference to the import demand analysis for Turkey's fishery products, while gross national product per capita, domestic prices, lagged import (ID_{t-1}), trend factor were found statistically significant, the exchange rate of the Turkish lira-US dollar was not found statistically significant.

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