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A Analysis of Import Demand for Meat and Meat Product in Turkey

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Abstract: This study examined factors affecting import demand for meat products of Turkey during the period 1984-2004. Coob-Douglas production function was used for determine the effect of factors. The double log-linear functional form was chosen for the response function. The data of this study comes from the State Institute of Statistics (SIS) and Central Bank of the Republic of Turkey (CBRT). According to the results, exchange rate, lag values of import demand for meat products, trend factor are statistically significant variables but per-capita income, reel domestic prices of meat products, are not statistically significant variables.

Key words: Import demand, meat and meat products, Coob-Douglas production function

INTRODUCTION

Meat and meat production sector is a sector in agro-food industry. Therefore, meat and meat sector depend on agricultural sector. The share of agricultural production in gross national product (GNP) is 13.5% while employment share of agriculture in the total civilian employment is 35.8% in Turkey. The agriculture sector is estimated to shrink by 5.8% in 2001. Although the importance of agriculture is diminishing within the economy, an important part of the population still depends on agriculture as the means of subsistence (SPO, 2002).

Import demand was examined in previous studies, too. For example, (Karkacier, 2000), analyzed the impacts of economic factors on import demand for dairy products in Turkey. (Hatirli *et al.*, 2002) examined factors affecting import demand for sunflower and soybean oil of Turkey. (Veeman *et al.*, 2004) focused on the demand for meat and the market vulnerabilities that apply to four selected Asian markets that are of potential importance to meat exporters. The markets identified for this purpose are Japan, South Korea, Indonesia and Singapore. (Miljkovic *et al.*, 2002), estimated that Japanese import demand for US beef and pork products and the effects on domestic livestock prices. (Schmitz and Seale, 2002), analyzed the import patterns of Japan's seven most popular fresh fruits by implementing and testing a general differential demand system that nests four alternative import demand specifications.

The aim of this study is to determine the factors affecting import demand for meat products of Turkey during the period 1984-2004. Furthermore, the study aims to examine the import value of meat and meat production in last years. In addition, to determine the factors affecting import demand can aid policy makers interesting this

Table 1: Value import and export of meat and meat products in Turkey

Years	Import of meat and meat products	Export of meat and meat products
1998	572	23944
1999	688	16682
2000	1759	13395
2001	611	19144
2002	198	16804
2003	538	23069
2004	901	26804

Source: SIS, 2005.

sector. Value import and export of meat and meat products in Turkey were showed in Table 1.

Table 1 showed that Turkey's import of meat and meat products decreased in 2001 and 2002 years because of Turkey's 2001 economic crisis and devaluation. Import value increased later from 2002 year.

MATERIALS AND METHODS

This study is based on yearly data for the period 1984 -2004. Data of Import value, domestic prices and gross national product per capita were obtained from the State of Institute Statistics (SIS, 1990; 1995; 1998; 2003; 2005). Data of Turkish lira-US dollar exchange rate was obtained from Central Bank of the Republic of Turkey (CBRT, 2005).

In this study import demand model was proposed and the parameters were estimated. Time series data was used in the regression analysis. The response model was discussed. Turkey's import demand for meat and meat products is specified as domestic prices, gross national product per capita, Turkish lira-US dollar exchange rate, lagged import and trend factor.

The response model is expressed as:

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

Where:

ID_t: The variable represents import demand value of meat and meat products. (Thousand \$)

GNP_t: The variable represents gross national product per capita (\$).

PM_t: The variable represents reel domestic prices of meat and meat products (1981=100 index was used for exchange reel prices).

EX_t: The variable represents Turkish lira-US dollar exchange rate (TL/USD)

ID_{t-1}: The variable represents import demand value of meat and meat products for previous year. (Thousand \$)

T: The variable represents trend factors (1,2,3,.....,20).

The functional form was chosen double log-linear as specified in Equation 2:

$$\ln(ID_t) = \alpha_1 + \alpha_2 \ln(GNP_t) + \alpha_3 \ln(PM_t) + \alpha_4 \ln(EX_t) + \alpha_5 \ln(ID_{t-1}) + \alpha_6 \ln(T) + \varepsilon_t \quad (2)$$

Where, ln = natural log (i.e., log to the base e and where, e = 2.718).

The relationship between a dependent variable and some explanatory variables $x_1, x_2, x_3, \dots, x_k$ is the specification of the functional relationship between the variables. For example, two alternatives that are commonly considered are a linear relationship (Judge *et al.*, 1988).

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \dots + \beta_k x_{tk} + \varepsilon_t \quad (3)$$

and a double log-linear relationship,

$$\ln y_t = \alpha_1 + \alpha_2 \ln x_{t2} + \alpha_3 \ln x_{t3} + \dots + \alpha_k \ln x_{tk} + \varepsilon_t \quad (4)$$

One important feature of the double log-linear model, which has made it popular in applied work, is that the slope coefficient α_i measure the elasticity of y with respect to x_i , that is percentage change in y for given (small) percentage change in x_i (Judge *et al.*, 1988; Gujarati, 1995).

Table 2: Analysis of the effects of factors on import demand of estimated model

	Coefficient	SD	T-ratio
Constant	34.10	29.67	1.15
GNP _t	-3.185	4.494	-0.71
PM _t	-0.667	1.594	-0.42
EX _t	-0.8564*	0.3228	-2.65
ID _{t-1}	0.4349*	0.1879	2.31
T	3.280**	1.519	2.16
R-Sq (%)	86.8		
R-Sq(adj) (%)	81.7		
F	17.02		
DW	1.92		

*and **indicate the significance level of 5% and 10%, respectively

RESULTS

The objective of the study was to determine the effect of factors on import demand for meat and meat production. Coob-Douglas production function was used for determine the effect of factors. Coob-Douglas production function has some advantage. Coefficients of this function represent elasticities. The double log-linear functional form was chosen for the response function.

Since time series data were used in this study, autocorrelation might be a potential concern and therefore needed to be tested, using the Durbin-Watson test. Durbin-Watson statistic value was calculated as 1.92. This value showed that there was no autocorrelation problem at 1% significance level in the estimated model. (d_f : 0,633 and d_u : 1,712 Thus $d > d_u$). The R-square (R^2) values were calculated as 86.8. This value showed that 86.8% of the variability in the import demand for meat and meat productions was explained by estimated model (Table 2).

Gross national product per capita (GNP_t) and reel domestic prices of meat and meat products (PM_t) variable's coefficients were not statistically significant. Turkish lira-US dollar exchange rate variable (EX_t) was statistical significant at the 5% level and it had got negative sign. This sign indicate that import value of meat decrease with the increase of US/TL parities. The negative sign is natural because of increases foreign exchange decreases amount of import. Results indicate a very strong relationship between exchange rate and import demand. Factor elasticity for (EX_t) was calculated as -0.8564. If exchange rate is increased one unit, the meat and meat import demand will decrease by 0.8564 units.

Lagged import variable (ID_{t-1}) was statistical significant at the 10% level and it had got positive sign. The sign show that import value of meat increase with the increase of lagged import value. Factor elasticity for lagged import variable (ID_{t-1}) was calculated as 0.4349. If previous year's import value is increased one unit, the meat and meat import demand will increase by 0.4349 units.

Trend variable represents the change which preference of consumers in the time (Karkacier, 2000). Trend factors variable (T) was statistical significant at the 5% level and it had got positive sign. This sign indicate that import value of meat increase with the increase of trend. In addition, the positive sign indicates that Turkish consumers would rather purchase import meat and meat products than purchase domestic meat and meat products gradually. Results indicate a very strong relationship between trend variable and import demand. Factor elasticity for (T) was calculated as 3.280. If trend variable increase one unit (one year), the meat and meat products import demand will increase dollar of 26 000.

DISCUSSION

This study analyzed the impacts of economic factors on import demand for meat and meat products. In addition, the relationship between import demand for meat and meat products and the factors (gross national product per capita, real domestic prices of meat and meat products, exchange rate, import demand value of meat and meat products for previous year, trend factors) was explored using functional models.

The results of the regression indicate that there is a very strong relationship between dependent variable (ID_t) and independent variables (exchange rate, previous import value, trend factor). The elasticity for exchange rate (EX_t), previous import value (ID_{t-1}), trend factor (T) were calculated as -0.8564, 0.4349 and 3.280 in the period, respectively.

This study can draw the following conclusions: exchange rate (EX_t), previous import value (ID_{t-1}) and trend factor (T) are important determinants in import demand. Furthermore, this variable's marginal coefficient are calculated as -0.8564, 0.4349 and 3.280, respectively. This coefficients are founded by Karkacier (2000) as 0.44, -0.47 and -0.66, respectively for dairy products in Turkey. (Hatirli *et al.*, 2002) calculated lagged oil of sunflower import and lagged oil of soybean import as -16.13 and 7.26, respectively.

The results show that exchange rate, lag values of import demand for meat products, trend factor are statistically significant variables but per-capita income, real domestic prices of meat products, are not in determining import demand for meat products. Consequently, exchange rate has negative effect, lag value of import demand and trend factors have positive effect on factor demand for meat products. This finding can aid for policy maker interesting meat sector.

REFERENCES

CBRT, 2005. Exchange rates, Central Bank of the Republic of Turkey Website, Available from: <http://www.tcmb.gov.tr/>

- Gujarati, D.N., 1995. Basic econometrics. 3rd Edn., McGraw-Hill, Inc. International Edition.
- Hatirli, S.A., V. Demircan and A.R. Aktas, 2002. Import Demand Analysis of Sunflower and Soybean Oil. The J. Agric Fac. Mediterranean Uni., 15: 71-79.
- Judge, G.G., R.C. Hill and W.E. Griffiths, 1988. Introduction to the Theory and Practice of Econometrics. John Wiley and Sons, Inc. USA.
- Karkacier, O., 2000. An analysis of import demand for dairy products in Turkey. Turk. J. Agric. and for., 24: 421-427.
- Miljkovic, D., J.M. Marsh and G.W. Brester, 2002. Japanese import demand for US beef and pork: Effects on US red meat exports and livestock prices. J. Agric. Applied Econ., 34: 501-512.
- Schmitz, T.G. and J.L. Seale, 2002. Import demand for disaggregated fresh fruits in Japan. J. Agric. Applied Econ., 34: 585-602.
- SIS, 1990. Statistical Yearbook of Turkey 1989. State Institute of Statistic Prime Ministry Republic of Turkey. Publication No. 1405.
- SIS, 1995. Statistical Yearbook of Turkey 1984. State Institute of Statistic Prime Ministry Republic of Turkey. Publication No. 1720.
- SIS, 1998. Statistical Yearbook of Turkey 1997. State Institute of Statistic Prime Ministry Republic of Turkey. Publication No. 2110.
- SIS, 2003. Statistical Yearbook of Turkey 2002. State Institute of Statistic Prime Ministry Republic of Turkey. Publication No. 2779.
- SIS, 2005. Turkey's Statistical Yearbook 2004. State Institute of Statistic Prime Ministry Republic of Turkey. <http://www.die.gov.tr/gostergeler.htm>.
- SPO, 2002. Profiles of Turkish public sector projects for foreign funding in 2002, State Planning Organization Publication, Ankara.
- Veeman, M.M., T.S. Veeman and S. Adilu, 2004. Analysis of East Asian meat import demand: Market prospects for Alberta and Canada. Department of Rural Economy Faculty of Agriculture and Forestry and Home Economics University of Alberta Edmonton, Canada, Project Report: 02-04, AARI Project #990030.