Tourism Demand for Turkey: Models, Analysis and Results

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Abstract

The main purpose of this study is to analyze the factors of tourism demand in Turkey for the arrivals from OECD countries. In the estimation period general-to-specific modeling approach is employed. Autoregressive Distributed Lag Model (ARDL) is applied for each country and the specified models are determined. The period covering 1980-2004 is used as an estimation period and each country's demand to Turkey are interpreted in detail by taking into account the demand elasticity and model results. This study does not only approach the tourism with econometric models, it also discusses the economics of findings and gives ideas about the future of Turkish tourism.

Keywords: Tourism demand, Turkish tourism, OECD countries, econometric models, tourist arrivals, Autoregressive Distributed Lag Model

1. Introduction

Turkey is a popular destination for the tourists from all over the world. Not only natural beauties and summer tourism, but also her cultural and historical affluence and history make Turkey visited by millions of foreign tourists each year.

In 2004 Turkey was ranked 12th in the World Tourism Organization's list of top destinations with the total tourist arrivals of 16.8 million. In the following year, 2005, this figure increased to 21.1 million. Furthermore, tourism receipts of Turkey in 1984 recorded as US$ 840 million, increased to US$ 15,888 million in 2004. In terms of international tourism receipts, Turkey became the third after Spain and Italy, with a 4.9% market share among Southern Europe countries in 2004.[1]

Even though Turkey has tourism arrivals from almost every country, the study focuses on the arrivals from Organization for Economic Co-operation and Development (OECD) countries. Tourism arrivals from the twenty OECD countries[2] are modeled and analyzed. Main reason for choosing OECD countries is that arrivals from these twenty countries constituted the 58.38 % of total tourism arrivals of Turkey in 2005. Another reason is existence of countries, which have significantly different economic conditions and income levels in OECD. A third reason is the diversity of cultures and geographic conditions of OECD members from different regions of the world in order to observe the effect of this factor on Turkish tourism.[3] The study aims to make a wide-ranging analysis for tourism demand of Turkey from OECD countries.

[1] http://www.world-tourism.org and http://www.turizm.gov.tr

[2] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, the Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, the United Kingdom (UK) and the United States (USA)

[3] Turkey is a member of the OECD.

Therefore, the main purpose of this study is to determine the factors affecting the demand for arrivals from the twenty OECD countries to Turkey.

Section two presents a literature review; while section three gives the analysis of the data. Section four and five explains the methodology and estimation process respectively. Finally, section six concludes and gives further research.

2. Literature Review

There exist numerous models in the tourism demand literature employing a variety of methods for estimating and forecasting the demand. A comprehensive literature review has been presented at the Appendix in a table format.

3. Data Analysis

3.1 Data

Data and sources used are:

Tourists arrivals from twenty OECD countries: Tourist arrivals for the period 1980-2004 from twenty OECD countries are obtained from the *Turkish Republic Ministry of Tourism Statistics*[4] and *National and International Tourism Statistics (1974-1985)*[5] (Only for New Zealand, arrivals data starts from 1984 because of data unavailability.). Total tourism arrivals from twenty OECD countries to Turkey and growth rates in total tourism arrivals are given in Table-3 at the Appendix.

Income for twenty OECD countries and Turkey: GDP indices (2000=100) of each country is used and obtained from *International Financial Statistics (IFS)* by IMF[6]

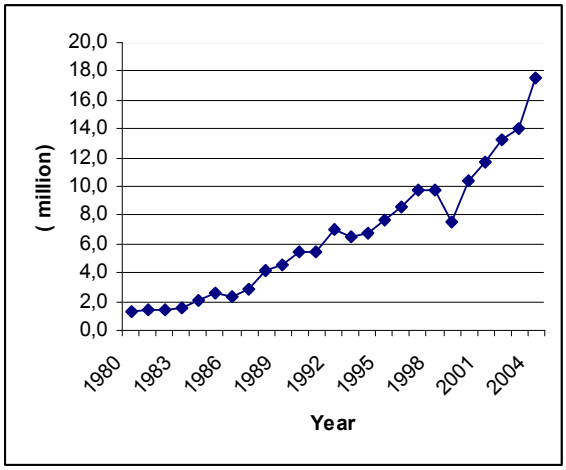
Consumer Price Indices (CPI) and Exchange Rate Indices (EX): (2000=100) indices are used for OECD countries obtained from *International Financial Statistics (IFS)* by IMF and (1995=100) indices obtained from *Central Bank of the Republic of Turkey Statistics*[7] are converted to (2000=100) indices and used for Turkey.

Tourist arrivals for alternative tourism destinations to Turkey (Italy, Cyprus and Greece): Annual total tourist arrivals statistics of three countries for the period 1980-2004 are obtained from *Yearbooks of Tourism Statistics* published by World Tourism Organization.

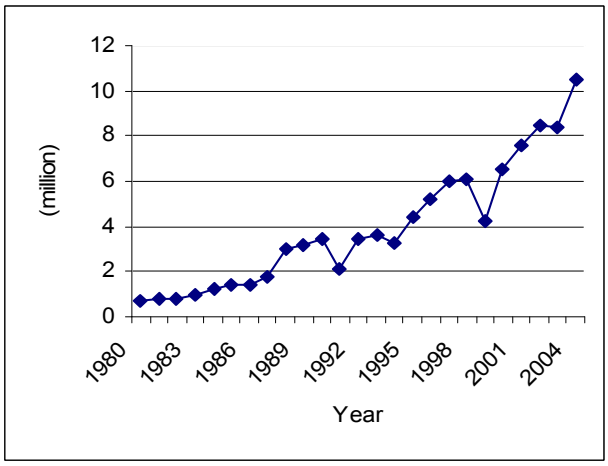
[4] www.turizm.gov.tr
[5] Published by OECD Publications and Information Centre (OECD, 1989)
[6] www.imfstatistics.org
[7] www.tcmb.gov.tr

3.2 Visual Inspection of Data

Plot of International Tourism Arrivals

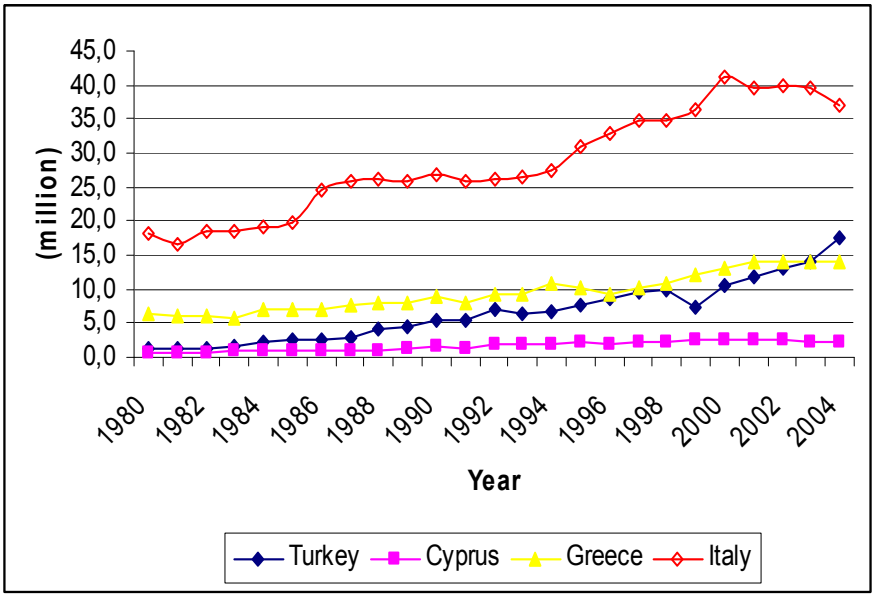


Plot of Total Tourism Arrivals from twenty OECD countries



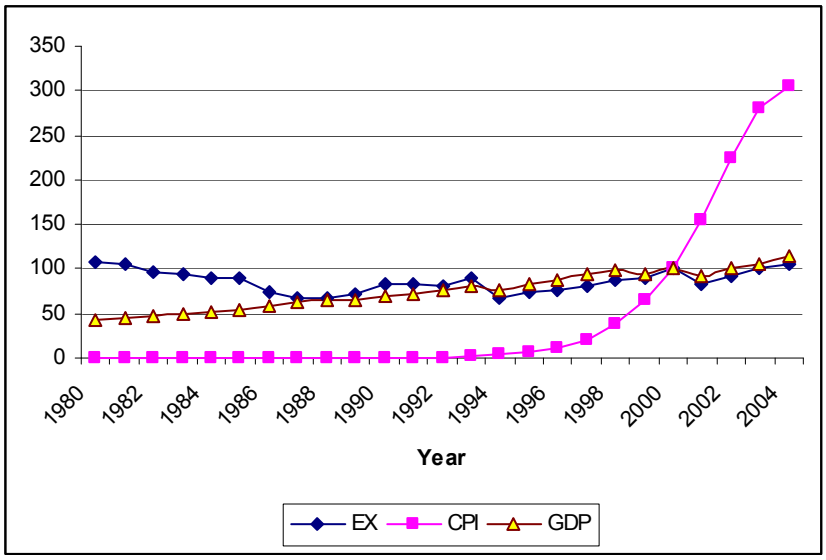
It can easily be seen from the first graph that total international tourism arrivals of Turkey have a tendency of increase covering the period from 1980 to 2004 with the exception of 1999. Second graph presents a similar pattern with the exception of 1991 and 1999. In 1991 Gulf War affected Turkish tourism as well as most of the countries in the region while the Marmara Earthquake measuring 7.4 on the Richter scale took a swing at the tourism in 1999.

Plot of Total Tourism Arrivals of alternative destinations and Turkey



Italy dominates other countries in tourist arrivals statistics among alternative destinations. In 2000 total tourist arrivals of Italy is over 40 million. Total tourist arrivals of Greece reaches Turkey's figure after 1995 and Cyprus has almost the same total tourist arrivals statistics during the period from 1980 to 2004.

Plot of Exchange Rate Index, Consumer Price Index and GDP Index of Turkey



Above graph shows that GDP index of Turkey has a tendency of increasing from 1980 to 2004 and exchange rate index is depreciating in some certain years. However, CPI of Turkey has an incredible increase beginning with late 1990s.

4. Methodology

4.1. Determinants of the model:

Autoregressive Distributed Lag Model (ARDL) is used for estimation in this study since it contains the factors affecting tourism demand and policy evaluation at the same time. Variables in the model are in the form of power functions since the tourism demand can be better modeled by power functions and it is easy to apply OLS in the estimation process (Song et al., 2003a).

The model is in the form of

$$Q_{it} = A \; P_t^{\beta 1} Y_{it}^{\beta 2} P_{st}^{\beta 3} e_{it} \qquad (1)$$

where Q_{it} is the tourism demand variable measured by tourism arrivals from country i to Turkey at time t ; P_t is the price of tourism in Turkey at time t ; Y_{it} is the income level of the origin country i at time t ; P_{st} is the price of tourism in the substitute destination at time t and e_{it} is the residual term and it is used to capture the influence of all other factors that are not included in the demand model. Residual term is important since tourism demand is influenced

by lots of economic and non-economic factors and most of them could not be included because of data unavailability.

The income variable, Y_{it}, is measured by the index of GDP (2000=100).

The own price variable, P_t, is calculated by the following formula;

$$P_{it} = \frac{(CPI_{Tur} / EX_{Tur})}{(CPI_{i} / EX_{i})}$$

where CPI_{Tur} and CPI_{i} are the consumer price indices for Turkey and origin country i respectively; EX_{Tur} and EX_{i} are the exchange rate indices (2000=100) for Turkey and origin country i, respectively. The exchange rate is calculated as the annual average market rate of local currency against the US dollar.

Substitute price variable, P_{st}, measures the cost of tourism in the alternative destinations to Turkey and three countries, Italy, Greece and Cyprus are considered as alternative destinations due to their cultural and geographic similarities to Turkey. Substitute price variable is calculated by the following formula;

$$P_{st} = \sum_{j=1}^{3} \left(\frac{CPI_{j}}{EX_{j}} \right) w_{j}$$

where j = 1,2,3 representing Italy, Greece and Cyprus as alternative destinations. w_{j} is the share of international tourism arrivals for country j, which is calculated by;

$$w_{j} = \left[\frac{TTA_{j}}{\sum_{j=1}^{3} TTA_{j}} \right]$$

where TTA_{j} is the total international tourism arrivals in country j.

Other factors that may influence tourism demand can be consumer tastes, transportation costs and advertising expenditure on tourism by destination in the origin country (Song and Witt, 2000). However, none of these factors have been included in this study since the data on these factors are either unavailable or difficult to measure.

4.2. Specification of the model

By taking the logarithm of equation (1), the following is obtained:

$$\ln Q_{it} = \lambda + \beta_1 \ln P_{it} + \beta_2 \ln Y_{it} + \beta_3 \ln P_{st} + u_{it} \qquad (2)$$

where $\lambda = \ln A$, $u_{it} = \ln e_{it}$, and β_1,β_2,β_3 are income, own price and substitute price elasticities, respectively.

We generate our final ARDL model by adding lags to each variable in the equation (2). This operation is done to convert the static model (2) to a dynamic one (Hendry, 1995). By a dynamic model, it is assumed to catch the previous year's effects on current year's tourism arrivals and to measure the *word of mouth effect* by the lag of dependent variable, Q_{it}. Word of mouth effect indicates how the early visits to one country influence the next visits and removes uncertainty about a destination for the arrivals who wants to prefer that destination (Song et al., 2003a).

Then our final model, ARDL becomes

$$\ln Q_{it} = \alpha_0 + \alpha_1 \ln Q_{it-1} + \alpha_2 \ln P_{it} + \alpha_3 \ln P_{it-1} + \alpha_4 \ln Y_{it} + \alpha_5 \ln Y_{it-1} + \alpha_6 \ln P_{st} + \alpha_7 \ln P_{st-1} + \varepsilon_{it} \quad (3)$$

If the long run equilibrium is assumed, the followings should be true: $\ln Q_{it} = \ln Q_{it-1}, \ln P_{it} = \ln P_{it-1}, \ln P_{st} = \ln P_{st-1}$ and $\varepsilon_{it} = 0$ in equation (3). Therefore, equation (3) can be re-arranged as;

$$\ln Q_{it} = \frac{\alpha_0}{(1-\alpha_1)} + \frac{(\alpha_2+\alpha_3)}{(1-\alpha_1)} \ln P_{it} + \frac{(\alpha_4+\alpha_5)}{(1-\alpha_1)} \ln Y_{it} + \frac{(\alpha_6+\alpha_7)}{(1-\alpha_1)} \ln P_{st} \quad (4)$$

where $\frac{(\alpha_2+\alpha_3)}{(1-\alpha_1)}, \frac{(\alpha_4+\alpha_5)}{(1-\alpha_1)}$ and $\frac{(\alpha_6+\alpha_7)}{(1-\alpha_1)}$ are price, income and substitute price demand elasticities. These demand elastisities are going to be used for making interpretation about tourism policy.

5. Estimation

5.1 Empirical work

In estimating equation (3), a number of dummy variables are also included to capture the effect of one-off events on the tourism demand of Turkey. Dummy variables are chosen due to the special events in some specific years. Dummy variables included in the model are;

D91: The Gulf War, which takes a value of 1 in 1991 and 0 otherwise
D94: Effect of terrorist acts in Turkey, which takes a value of 1 in 1994 and 0 otherwise
D97: Financial crises in Asia, which takes a value of 1 in 1997 and 0 otherwise
D99: The Marmara Earthquake in Turkey, which takes a value of 1 in 1999 and 0 otherwise
D01: September 11 in US, which takes a value of 1 in 2001 and 0 otherwise

Therefore ARDL model with dummies becomes

$$\ln Q_{it} = \alpha_0 + \alpha_1 \ln Q_{it-1} + \alpha_2 \ln P_{it} + \alpha_3 \ln P_{it-1} + \alpha_4 \ln Y_{it} + \alpha_5 \ln Y_{it-1} + \alpha_6 \ln P_{st} + \alpha_7 \ln P_{st-1} + dummies + \varepsilon_{it} \quad (5)$$

Being the main part of the estimation period, a general-to-specific procedure (Song and Witt, 2000) is followed to eliminate the insignificant or economically unacceptable variables from the general ARDL. Firstly we attempt to whether the variables are significant or not by using OLS to estimate equation (5). Then we eliminate insignificant variables by looking at their significance levels. In the equation (4) for demand elasticities, the coefficient of price variable is expected to be negative, the coefficient of income variable is expected to be positive and the coefficient of substitute price variable is expected to be positive by economic theory (Song et al., 2003a). Thus, the variables with wrong signs are also going to be eliminated if any forecasts are going to be done due to these models.

After significance process, the diagnostic checking including White's heteroscedasticity test, Godfrey's autocorrelation test, Jarque-Bera's normality test, ARCH test for autoregressive conditional heteroscedasticity effect, Ramsey's Reset test for mis-specification and Chow's predictive failure tests are applied and the models for checking and consistency purposes. These tests are employed to understand whether the estimated model gives reliable results/interpretations or not. Although it is not a case of this study, the models that pass all of these tests can also be employed for forecasting the following years' tourism arrivals.

Finally, above procedure is applied for twenty OECD countries and the results of each country's model are obtained.

5.2 Results

Significance levels of variables in equation (5) after OLS process of twenty OECD countries are given in Table-1 in the following page. The table also contains diagnostic checking test results with their significance levels.

In Table-1 significant variables in the models of OECD countries are specified with italic figures. Furthermore, diagnostic tests which have failed with respect to $\alpha = 0.05$ significance level are specified in bold fonts.

It is a striking fact that *word of mouth effect* is an important factor in Turkish tourism for especially Scandinavian OECD countries like Denmark, Finland, Norway and Sweden since lagged tourism arrivals variable is significant for the models of these countries. Other countries in this situation are Australia, France, Germany, Japan, Switzerland, UK and the Netherlands.

Price of tourism in Turkey does not constitute a problem for the tourists from OECD countries. Current year's tourism prices are criteria only for Swiss and Austrian tourists and tourists from Japan, Switzerland and France consider the previous year's tourism prices in Turkey while they are coming. This implies that Turkey is a cheap destination for OECD countries in general.

If the income level of origin countries is asked as an explanatory variable of tourist arrivals of Turkey, it becomes apparent that income level is an important factor for European OECD countries. Income level variable is significant for Austria, Belgium, France, Germany, Greece and UK.

Table-1: OLS and diagnostic test results of models with significance levels

Variab.	*Aust-ralia*	*Aust-ria*	*Bel-gium*	*Ca-nada*	*Den-mark*	*Fin-land*	*Fra-nce*	*Ger-many*	*Gre-ece*	*Italy*	*Ja-pan*	*Nether-lands*	*N.Ze-aland*	*Nor-way*	*Po-land*	*Spain*	*Swe-den*	*Switzer land*	*UK*	*US*
$\ln Q_{it-1}$	***0.023***	0.121	0.575	0.388	***0.041***	***0.000***	***0.010***	***0.000***	0.324	0.120	***0.004***	***0.002***	0.058	***0.000***	0.070	0.238	***0.000***	***0.023***	***0.004***	0.616
$\ln P_{it}$	0.141	***0.046***	0.347	0.091	0.093	0.117	0.055	0.277	0.224	0.689	0.111	0.931	0.617	0.810	0.501	0.203	0.184	***0.003***	0.235	0.379
$\ln P_{it-1}$	0.088	0.271	0.213	0.094	0.303	0.098	***0.022***	0.316	0.474	0.664	***0.043***	0.724	0.649	0.889	0.317	0.051	0.191	***0.003***	0.318	0.296
$\ln Y_{it}$	0.088	***0.000***	***0.011***	0.101	0.562	0.917	***0.017***	***0.024***	***0.001***	0.104	0.072	0.594	0.796	0.245	0.953	0.272	0.821	0.846	***0.003***	0.074
$\ln Y_{it-1}$	0.491	0.663	0.614	0.456	0.826	0.404	0.357	***0.049***	***0.008***	0.452	0.463	0.594	0.134	0.217	0.837	0.470	0.304	0.154	***0.010***	0.160
$\ln P_{st}$	0.208	0.823	***0.037***	0.246	0.663	0.575	0.107	0.619	0.116	0.710	***0.033***	0.415	0.358	0.112	0.968	0.144	0.467	0.085	0.903	***0.007***
$\ln P_{st-1}$	0.635	0.442	0.127	0.280	0.696	0.293	0.054	0.591	0.179	0.948	0.268	0.530	0.296	0.377	0.879	0.149	0.948	***0.016***	0.740	***0.009***
D91	***0.017***	***0.000***	***0.000***	0.197	0.304	0.293	***0.000***	***0.007***	***0.011***	***0.002***	***0.000***	0.103	***0.022***	***0.028***	0.268	***0.003***	***0.032***	***0.006***		***0.014***
D94	0.055	0.079	0.148	0.152	0.172	0.139	***0.015***	***0.009***	0.828	0.089		0.411		0.346		0.126				
D97											0.401									
D99	***0.029***	***0.000***	***0.028***	0.375	0.092	***0.011***	***0.004***	***0.000***	0.250	***0.000***	0.280	***0.004***	0.051	0.293	0.524	0.065	0.151	***0.000***	0.243	
D01																				0.453
White	0.762	0.986	0.971		0.976	0.866	0.998	0.999	0.456		0.569	0.436		0.922			0.853	0.983	0.078	0.341
J-Bera	0.519	0.647	0.681		0.869	0.624	0.988	0.998	0.595		0.175	0.399		0.742			0.268	0.724	0.456	0.581
Reset	0.419	0.352	0.396		0.145	**0.014**	0.051	0.110	**0.036**		**0.012**	0.671		0.052			0.097	0.927	0.106	0.451
Godfrey	0.173	0.132	0.132		0.438	0.192	0.173	0.173	0.173		0.173	0.185		0.174			0.268	0.173	0.173	0.173
Chow	0.854	0.886	0.716		0.836	0.754	0.472	0.920	0.141		0.450	0.411		0.952			0.938	NA	0.448	0.271
ARCH	0.597	0.496	0.824		0.459	0.643	0.658	0.677	0.786		0.271	0.583		0.421			0.336	0.278	0.339	0.327

Notes: 1) $\alpha = 0.05$ significance level was considered as a base.
2) White, J-Bera, Reset, Godfrey, Chow and ARCH are diagnostic tests.

When the prices of tourism in alternative destinations (Italy, Greece and Cyprus) are analyzed, tourists from Belgium, Japan and US consider this factor for the current year and tourists from Switzerland and US think about the previous year's prices in the alternative destinations.

It seems that one-off events played a vital role in the tourism demand of Turkey. The Gulf War is significant for most of the OECD countries' tourists, especially for Europeans. Turkish tourism is also badly influenced by the Marmara Earthquake and this variable is significant for Australia, Austria, Belgium, Finland, France, Germany, Italy, the Netherlands and Switzerland.

One of the interesting results obtained from the analysis is that tourism arrivals variable cannot be explained with any of the explanatory variables for Canada and Poland. Thus, we cannot say anything about the future tourism arrivals from these two countries by using these demand models.

Almost all models of the twenty OECD countries passed the diagnostic checking tests. Finland, Greece and Japan are the only countries that failed in Reset test. It means that these three models are not correctly specified, thus, their forecast results may not be as reliable as the other models if any forecast is done.

5.3 Demand Elasticities

Based on estimated demand models in Table-1, it is possible to obtain demand elasticities. Demand elasticities are important since they can be used for policy making and business planning in tourism sector. For instance, if the price elasticity is larger than 1, i.e $|w|>1$, then, an increase in tourism price will result in a more than proportionate decrease in quantity demanded, thus, total tourism revenue will fall since total tourism revenue is equal to price of tourism services times the total quantity demanded (Song and Witt, 2000).

Due to the established model in equation (5), it is expected that the price elasticity is negative, income elasticity is positive and substitute price elasticity is positive by economic theory and the variables with wrong-signed elasticities are also considered as insignificant.

Table-2 gives the demand elasticities of twenty OECD countries due to their demand models.

For the tourists Australia, Austria, Belgium, Canada, France, Greece, Japan, New Zealand, Spain, Sweden, Switzerland and US, an increase in tourism price of Turkey will result with an increase in total tourism revenue since their price elasticities in absolute value is less than 1. On the contrary, an increase in tourism price will decrease the total tourism revenue from the tourists of Finland.

An income elasticity that is smaller than 1 implies that the demand for tourism in a destination is insensitive to the economic situation in the origin country (Song and Witt, 2000).Therefore, except Denmark and the Netherlands, for all other countries, a rise in income of these countries will be accompanied by a more than proportionate rise in tourism demand of Turkey since their income elasticities are higher than 1.

Since the substitute price elasticities are smaller than 1, it can be said that tourism in Turkey is not very sensitive to the price changes in alternative destinations in general.

Table-2: Demand Elasticities

Country	Price	Income	Substitute price
Australia	-0.289	4.237	0.743
Austria	-0.307	8.277	0.207
Belgium	-0.106	8.488	0.261
Canada	-0.085	3.093	0.329
Denmark	0.701	-9.320	-0.000
Finland	-1.656	69.625	-9.964
France	-0.216	9.389	-0.201
Germany	0.148	2.553	0.002
Greece	-0.194	3.523	-0.309
Italy	0.015	5.227	-0.396
Japan	-0.084	4.325	0.915
Netherlands	0.513	-0.745	-0.687
New Zealand	-0.487	10.844	0.141
Norway	1.096	11.340	-12.989
Poland	0.146	2.1308	0.486
Spain	-0.539	10.119	0.120
Sweden	-0.430	31.756	-4.784
Switzerland	-0.156	7.242	0.431
UK	0.056	5.694	-0.654
US	-0.057	1.498	0.601

6. Conclusions and Further Research

This study analyses the tourism demand of Turkey from the arrivals of twenty OECD countries for the period of 1980-2004. An ARDL model is used in the estimation process for each country and general-to-specific approach is followed in the specification of demand models. Being the explanatory variables for the tourism arrivals, three main factors like the price of tourism in Turkey, income level of the origin country and price of tourism in alternative destinations were considered. Furthermore, some dummy variables are included in the demand models to catch the effect of one-off events on Turkish tourism.

As the results of demand models following implications can be said;

- *Word of mouth effect* is an important factor in Turkish tourism for especially Scandinavian OECD countries,
- Price of tourism in Turkey is generally not a problem for OECD countries' tourists. Current year's tourism prices are criteria only for Swiss and Austrian tourists,
- Income level is an important factor for European OECD countries,
- Only the tourists from Belgium, Japan and US consider the price in alternative destinations for the current year and US and the Swiss tourists think about the previous year's prices in the alternative destinations,
- The Gulf War is significant for most of the OECD countries, especially for Europeans. Turkish tourism is influenced by the Marmara Earthquake in 1999,

- For the tourists from Australia, Austria, Belgium, Canada, France, Greece, Japan, New Zealand, Spain, Sweden, Switzerland and US, an increase in tourism price of Turkey will result with an increase in total tourism revenue,
- Except Denmark and the Netherlands, for all other countries, a rise in income of these countries will be accompanied by a more than proportionate rise in tourism demand of Turkey,
- Tourism in Turkey is not very sensitive to the price changes in alternative destinations in general.

Due to the demand models specified in this study, short or long-term forecasts of the tourism arrivals of OECD countries can be a case of another study. Moreover, the analysis and results, which were obtained in this study, can be used by policymakers and business/travel planners to draw the future tourism road-map of Turkey for their specific purposes.

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APPENDIX

LITERATURE REVIEW

Title/ Author(s)/Year	Model	Results
Forecasting Models For Tourism Demand in City Dominated and Coastal Areas (Ann Clewer et al., 1990)	Structural time series models from the class of UCAIMA	The results indicate that, ceteris paribus, the tourism demand growth rates in the Spanish provinces considered are unlikely to revert to the previous high levels
A note on forecasting international tourism demand in Spain (A.G. Ferrer, R.A. Queralt, 1997)	Univariate models	Inputs' contribution in terms of fitting and forecasting is nil when compared with alternative univariate models and accuracy measures like RMSE and MAPE help very little in discriminating among competing models
Review of International Tourism Demand Models (Christine Lim, 1997)	100 published studies of empirical international tourism demand models	Economic variables affecting tourism demand, such as income, relative prices and tourism prices, and transportation costs are analyzed
Tourism Demand in Turkey (O. Icoz, T. Var, M. Kozak, 1998)	OLS	The elasticities for all of the variables significantly vary from negative values to highly elastic measure. It indicates the responsiveness to tourism flows to Turkey varies with the change in the travel agency numbers
The demand for tourism in North East England with special reference to Northumbria: An empirical analysis (H.R. Seddighi, D.F. Shearing, 1997)	Johansen and Juselius Multivariate Cointegration Analysis	A long-run relationship between the expenditure on tourism and relative price of tourism, and real total disposable income. In the short-run, changes in tourism expenditure appear to be influenced by relative price, real total disposable income and an error-correction term
A Compact Econometric Model of Tourism Demand for Turkey (Sevgin Akış, 1998)	Double-logarithmic functional form of the regression model	Positive relationship between tourist arrivals and national income of tourist generating countries and a negative relationship between tourist arrivals and relative prices
A Dynamic International Demand Model (Clive L. Morley, 1998)	Theoretical model of the dynamic structure of tourism demand (nonlinear)	Incomes have a key role in explaining international tourism to Australia and constant elasticity demand models are likely to be misspecified
Forecasting Tourism Demand in Asian-Pacific Countries (Fong-Lin Chu, 1998)	Six time-series models	Accuracy of forecasts differs depending on the country being forecast, but the Seasonal-Nonseasonal ARIMA models is overall the most accurate model for forecasting tourist arrivals
Forecasting International Tourism Trends to 2010 (E. Smeral, A. Weber, 2000)	WTTOUR98	For most hard-currency countries participation in the currency union implies a slowdown in tourism imports and an acceleration in exports. For the soft-currency countries, however, the creation of the euro zone implies disadvantages in international tourism

A practitioners guide to time-series methods for tourism demand forecasting- a case study of Durban, South Africa (C.J.S.C. Burger et al., 2001)	Several time-series forecasting methods (Naive, MA, ARIMA, neural network etc.)	Survey shows that the neural network method performs the best
Cointegration analysis of quarterly tourism demand by Hong Kong and Singapore for Australia (C. Lim and M. Mcaleer, 2001)	Cointegration analysis with Vector Error Correction (VEC) models	Existence of an equilibrium long- run relationship among important economic variables determining international tourism demand from Hong Kong and Singapore
Forecasting Tourism Demand: An STM Approach (Kevin Greenidge, 2001)	Structural Time Series Modeling (STM)	This study found STM models offered valuable insights into the stylized facts of tourism behavior and provided reliable out-of-sample forecasts
A Comparison of Two Econometric Models (OLS and SUR) for Forecasting Croatian Tourism Arrivals (Tihomir Stučka, 2002)	OLS and SUR	SUR model yields more precise predictions of foreign arrivals to Croatia
Modeling and forecasting tourism demand for arrivals with stochastic nonstationary seasonality and intervention (Carey Goh, Rob Law, 2002)	SARIMA and MARIMA	SARIMA and MARIMA with intervention analysis are compared with other eight time series models and were found to have the highest accuracy
Modeling Inbound International Tourism Demand to Portugal (A.C.M. Daniel, F.F.R. Ramos, 2002)	Johansen cointegration analysis	Tourism demand of Portugal from five countries are analyzed and relationship between the demand and other variables are examined
Time series forecasts of international travel demand for Australia (C. Lim, M. McAleer, 2002)	ARIMA	The fitted ARIMA model forecasts tourist arrivals from Singapore very well. ARIMA model outperforms the seasonal ARIMA models for Hong Kong and Malaysia, but, forecasts are nor accurate as in Singapore
An Econometric Estimation of the Demand For Tourism: The case of Switzerland (G.F. Luzzi, Y. Flückiger, 2003)	OLS	Swiss tourism is superior good for Americans, America's elasticity is much higher than Europeans and tourism products in Switzerland are luxury goods for Japanese tourists
Modeling and forecasting the demand for Hong Kong tourism (H. Song et al, 2003a)	Autoregressive Distributed Lag Model (ARDL) & Exponential Smoothing	Tourism arrivals to Hong Kong for the period 2001–2008 are forecasted. Factors determining the Hong Kong tourism are identified
Tourism forecasting: accuracy of alternative econometric models (Haiyan Song et al., 2003b)	Autoregressive distributed lag model (ARDL)	TVP model generates the most accurate one-year-ahead forecasts, followed by the static model. For three- and four-years-ahead forecasts the static model is ranked first

A Model of Demand for International Tourism (Sarath Divisekera, 2003)	Almost ideal demand system model (AIDS)	This study incorporates the cost of international travel, a key economic factor that has been largely ignored by previous researchers. It generated new information on the effects and sensitivity of economic parameters and their influence over demand
Forecasting tourism demand: a cubic polynomial approach (Fong-Lin Chu, 2004)	A cubic polynomial time-series model	Cubic polynomial model generates relatively accurate forecasts against time-series models for Singapore
An ARDL Model of International Tourist Flows to Turkey (Ferda Halicioglu, 2004)	Autoregressive Disrtibuted Lag Model (ARDL)	Income is the most significant variable in explaining the total tourist arrivals to Turkey, then, relative prices and transportation cost
Predicting tourism demand using fuzzy time series and hybrid grey theory (Chao-Hung Wang, 2004)	Two models based on artificial intelligent (AI)	Fuzzy time series is suitable for Hong Kong arrival to Taiwan, GM(1,1) model appropriate for Hong Kong and US arrival, Markov-improved model is the best for German tourism demand
A technical analysis approach to tourism demand forecasting (C. Petropoulos et.al., 2005)	Technical analysis techniques	Evaluation results make the proposed model rather attractive and by all means worth expanding
An econometric study of tourist arrivals in Aruba and its implications (R.R. Croes, M.Vanegas Sr., 2005)	A dynamic econometric model	Results indicated the extent to which cross-country behavior of demand differs with respect to changes in effective prices and exchange rates
German demand for tourism in Spain (Teresa Garín Muñoz, 2005)	A dynamic model	Demand in the previous period has an important effect on current tourism demand. Demand for tourism in Spain is a luxury for the Germans and highly dependent on the evolution of relative prices and cost of travel
Managing Value-at-Risk in Daily Tourist Tax Revenue for the Maldives (M. McAleer et al., 2005)	Symmetric GARCH and asymmetric GJR	Both volatility models led to the same average VAR at -6,59 %, e.i., the lowest possible growth rate in daily tourists in residence, hence in tourist tax revenues was -6,59 % at the 99% level of confidence
Modeling multivariate international tourism demand and volatility (C. Lim et al., 2005)	CCC-MGARCH, vector ARMA-GARCH and vector ARMA-AGARCH models	Results provided evidence of crosscountry interdependent and dependent effects in the conditional variances between the different countries. Asymmetric effects were detected in two countries, namely Japan and New Zealand
Forecasting international tourist flows to Macau (H. Song and S. F. Witt, 2006)	Vector autoregressive model (VAR)	Macau will face increasing tourism demand by residents from mainland China, numarical forecasting results are found for arrivals from eight countries to Macau until 2008

Inbound international tourism to Canary Islands: a dynamic panel data model (Teresa Garín Muñoz, 2006)	A dynamic model	Tourism demand to Canary Islands must be considered as a luxury good and is highly dependent on the evolution of relative prices and cost of travel
Modeling US tourism demand for European destinations (Z. Han et al, 2006)	Almost ideal demand system model (AIDS)	In the absence of a tourism price index, the choice between alternative price indices does not have a significant effect on the results. Price competitiveness is important for US demand for France, Italy and Spain but is relatively unimportant for the UK
Time varying parameter and fixed parameter linear AIDS: An application to tourism demand forecasting (H. Song et al., 2006)	Time varying parameter (TVP) linear almost ideal demand system (LAIDS)	Unrestricted TVP-LRLAIDS and TVP-EC-LAIDS outperform their fixed-parameter counterparts in the overall evaluation of demand level forecasts, TVP-EC-LAIDS is also ranked ahead of most other competitors

Table-3: Total tourism arrivals from twenty OECD countries to Turkey and growth rates in total tourism arrivals

COUNTRY	1980	1990	2000	2004	2005	1980-1990	1990-2000	2000-2005
Australia	7,617	37,045	58,295	67,413	91,113	386%	57%	56%
Austria	35,508	196,561	320,582	455,863	486,066	453%	63%	51%
Belgium	12,324	56,258	256,881	426,971	503,825	356%	356%	96%
Canada	11,561	34,575	56,598	52,870	81,230	199%	63%	43%
Denmark	7,807	34,507	100,967	214,948	304,641	342%	192%	201%
Finland	5,467	104,321	53,440	80,908	95,737	1808%	-48%	79%
France	87,342	310,809	449,545	548,858	701,192	255%	44%	55%
Germany	155,440	973,914	2,277,502	3,983,899	4,243,602	526%	133%	86%
Greece	59,106	227,709	218,670	485,417	584,952	285%	-3%	167%
Italy	63,215	156,342	218,785	318,097	401,842	147%	39%	83%
Japan	6,865	35,358	89,459	64,318	116,974	415%	153%	30%
Netherlands	19,051	150,337	440,290	1,191,382	1,254,209	689%	192%	184%
New Zealand	na	12,937	13,509	12,552	17,617	na	4%	30%
Norway	2,628	39,889	67,517	120,143	161,764	1417%	69%	139%
Poland	32,549	206,682	118,174	138,327	181,033	534%	-42%	53%
Spain	21,471	62,220	93,105	115,764	198,462	189%	49%	113%
Sweden	8,452	110,204	148,561	284,086	405,952	1203%	34%	173%
Switzerland	18,024	76,368	81,446	271,387	308,715	323%	6%	279%
UK	62,192	351,458	915,285	1,387,808	1,758,072	465%	160%	92%
US	118,669	205,831	515,090	291,102	434,982	73%	150%	-15%
TOTAL	**735,288**	**3,383,325**	**6,493,701**	**10,512,113**	**12,331,980**			

Notes: 1) Table was prepared based on the statistics available at http://www.turizm.gov.tr

2) Negative percentages in the table were result of one-off events. For Finland and Poland, the Gulf War (1991), terrorist acts (1994) and the Marmara Earthquake (1999) caused a negative percentage. For US, September 11 was the most important reason of the negative percentage.