The ARDL Approach to Cointegration Analysis of Tourism Demand in Turkey: with Greece as the substitution destination.

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The ARDL Approach to Cointegration Analysis of Tourism Demand in Turkey: with Greece as the substitution destination.

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Abstract

This paper estimates tourism demand model for Turkey from 13 countries: Austria, Belgium, Bulgaria, Denmark, France, Germany, Holland, Italy, Russia, Sweden, Switzerland, United Kingdom and United States. The aim of this paper is to investigate the determinants of demand for Turkey's tourism and to examine cointegration relationships in the considered model, over the period from 1996 to 2006 year on the monthly basis. This paper uses the autoregressive distributive lag (ARDL) approach advocated by Pesaran and Pesaran (1997), which is more appropriate for studies with small samples. From our results we found evidence at the high significance level of a long-run cointegration relationships among the variables. The study shows that the most significant impact on the tourism demand in the long-run as well as in the short-run has income of tourist arrivals. In addition, the applied CUSUM and CUSUMSQ stability tests confirm the stability of the tourism demand model in most of considered countries.

JEL Classification Codes: C32, C52, F14, F41

Keywords: demand, elasticity, cointegration, ARDL, vector error correction, stability test.

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1.Introduction

The purpose of this study is to investigate the long-run relationships between variables of the Turkey's tourism demand model by examining the determinants of these relationships and factors affecting it. This research employs an autoregressive distributed lag (ARDL) model in order to measure elasticities of income and relative prices in demand for Turkey from considered countries. It attempts as well to examine the stability of tourism demand in Turkey.

Tourism is playing an important role for Turkey. Share of tourism in total export increased from 6 percent in 1984 to 13 percent in 2007 with its peak of 19 percent in 2003 year. However in real terms the income from tourism export (in million dollars) was continuously increasing through these years, thus it is increased more than 3 times for the considered period between 1996 and 2007, or by 33 times from 1984 to 2007. Number of tourist arrivals increased by 132 percent for the last 10 years[2], from 8.5 million to 19.8 million tourists. According to World Travel and Tourism Council (2008) travel, tourism economy in Turkey directly and indirectly accounts for 11.3% of GDP. It is expected that in the forthcoming 10 years the travel and tourism economy will grow by 4.8% annually.

Taking into account that tourism is one of primary sources of foreign currency earning and employment generation, with its growing role in economy of Turkey it is necessary to pay more attention has to the economic determinants of the tourism for Turkey.

In past several decades at the international level there is growing interest to tourism demand among researches. In tourism demand modelling several variables are used as a demand proxy, for example number of tourist arrivals, tourists' expenditures, lodging guest arrivals. Factors influencing tourism demand are usually selected from income of tourist

[2] This information is calculated using statistics of Turkish Statistical Institute, TurkStat, and of Central Bank of the Republic of Turkey.

generating country, price indexes, exchange rate, transportation costs, price indexes of substitution destinations and various dummies. Studies on tourism demand mainly are divided in two groups in terms of methodology. One group is using time-series models, where tourism demand as a dependant variable is being explored and forecasted according to historical trends and without finding of causes of the patterns. Estimation and forecasting method which is used in these types of studies mainly is based on the integrated autoregressive moving-average models (ARIMAs) which was first proposed by Box and Jenkins (1970). See for example, Kulendran (1996), Kim and Song (1998), Martin and Witt (1989), Song et al. (2003a) and Turner et al. (1997). Another group concentrates on the econometric approaches, which explain the causal relationships between dependent and independent variables. At the same time econometric techniques can be useful for policy recommendation by examining estimated elasticities of tourism demand. Examples of studies based on econometric techniques are follows: Dritsakis (2004), Song and Witt (2000), Song and Witt (2006), Witt et al. (2004), Kulendran and Wilson (2000).

Substitution destinations are taking important part in tourism demand modelling. Thus some researches investigate tourism demand by various methodologies of econometric analysis, are trying to find factors which influence the level of tourists' visits, where the selected substitution destination, domestically as well as internationally, in many cases is found as main competitor, as individual county, see Patsouratis et. al (2005), Song and Witt (2006), Allen et. al (2008). In some cases substitution destination was selected as the average (weighted calculation) of a possible competitor countries, see for example, Song et al (2003b), Querfelli (2008).

In literature there is growing interest to the tourism demand of Turkey as well, for example Icoz et al. (1998) in their research used multivariable regression model where variables such as the number of ministry licensed hotel beds, the number of incoming travel agencies in Turkey, consumer price index and exchange rates are explaining the number of visitors who came to Turkey from 10 selected European countries for the period between 1982 and 1993. The results of their research showed that considered independent variables had slight effect on the number of tourists from selected European countries. Elasticities of the price index were found negative for most of the countries with high coefficient, while the elasticity of coefficients of the foreign exchange rate variable displayed positive sign for most of selected European countries.

Very close time period to the previous paper is analyzed by Akis (1998), which is between 1980 and 1993. Akis focused only on the most important variables explaining tourism demand for Turkey using approach similar to Smeral et al. (1992), in order to minimize some econometric problems such as multicollinearity and small degrees of freedoms. National income of tourist generating country and the relative prices variables are explaining tourism demand for Turkey in terms of the number of tourist arrivals from 18 selected countries. Findings of this research are similar to other studies on the tourism demand. National income was found positively related to the number of tourist arrivals while relative prices presented negative sign in relation to the number of tourist arrivals.

Halicioglu (2004) in his study focused on a recent cointegration technique on the international tourism demand for Turkey in order to examine the main determinants that affect demand and to analyse the importance of a stable tourism demand equation. This paper's findings do not contradict to the previous empirical studies in the tourism economics literature. In addition, using stability tests it was found that a stable tourism demand function exists for Turkey case. This finding can be useful in tourism policy implementation, as "stability of a tourism demand function will reduce the uncertainty associated with the world economic environment".

This paper presents a cointegration analysis of multivariate time series. This study differs from the previous empirical tourism studies on Turkey in a way that it employs special case of substitute country. Economic variables such as income, relative prices of living and price of living in substitute country are used to explain tourist arrivals to Turkey from 13 considered countries, where Greece is considered as substitute country. Monthly data is used in this paper covering period from 1996 to 2006.

The organisation of the rest of this paper is as follows. In Section 2 the theoretical approach is examined with the focus on the tourism demand and its determinants. Section 3 describes the data used in the research. Section 4 represents empirical results and the final section summarises the conclusions.

2.The Theoretical Approach

To empirically analyse the long-run and short-run relationships among variables of interest. In this research VAR model is used in order to measure elasticities of income and relative prices in demand for Turkey from 13 countries. Number of tourists from these countries consists of 65-70 (Table 1) percent of all tourist arrivals to Turkey every year.

The tourist demand function was taken as follows:

$$TA_{it} = (Y_{it}, RP_{it}, SP_t) \qquad (1)$$

where TA_{it} is the number of tourist arrivals to Turkey from the *i* country at the *t* period. Y_{it} is the real income at *i* country origin at the *t* period, measured, as a proxy, by monthly industrial production index. RP_{it} is the relative price of Turkey compared to the tourists' origin *i* at the period *t* and measured by CPI, with 2000 as a base year. SP_t is the relative price of living for tourists in substitute destinations which is Greece, to price of living in Turkey and adjusted by exchange rate. In tourism related literature it was found that variables such as tourists' income, relative cost of living, relative price of substitute destination and exchange rates are the most important variables of tourism demand modelling, (see Lim, 1999 and Li et al., 2005). At the same time tourist arrivals variable is still the most popular measure of tourism demand (Song and Li, 2008).

Relative price of Turkey P_{it} is calculated by the following formula:

$$RP_{it} = \frac{CPI_T}{CPI_i x ER_i}$$

where *CPI* and *ER* denote consumer price index and exchange rate respectively at the tourists' origin *i*, CPI_T is the consumer price index of Turkey.

Relative price of the substitute destination is calculated by the following formula, Song and Witt (2006):

$$SP = \frac{CPI_G x ER_G}{CPI_T}$$

where CPI_G and ER_G denote consumer price index and exchange rate respectively at the substitute destination, Greece. CPI_T is the consumer price index of Turkey

Transforming variables of the equation (1) to the logarithmic form we will get the following equation:

$$\ln TA_{it} = \alpha_0 + \alpha_1 \ln Y_{it} + \alpha_2 \ln \mathrm{RP}_{it} + \alpha_3 \ln SP + \varepsilon_{it} \quad (2)$$

where ε is a stochastic disturbance term.

We assume that coefficient a_1 of income of tourists' origin country *i* - will be positively related with tourism demand in terms of tourist arrivals to Turkey. Generally income elasticities are found positively related to the international tourism demand with relatively high value (Crouch, 1994). However coefficients of relative prices a_2 should be negatively related to the variable of tourism demand. Relative price of the substitute destination a_3 was included in the model as well and it is supposed that it shall be positively related to the tourist arrivals variables. Higher relative prices in the substitute destination will attract more tourists to Turkey, while lower relative prices of Greece will attract more tourists to the substitute country and consequently fewer tourists to Turkey. Therefore expected signs for parameters are as follows: $a_1>0$, $a_2<0$ and $a_3>0$.

Model in equation 2 is used to empirically analyse the long-run relationships and dynamic interactions among the variables of trade. To incorporate the short-run dynamics, the model has been estimated by the using the bounds testing (or autoregressive distributed Lag, ARDL) approach to cointegration, developed by Pesaran et. al (2001). The procedure is adopted for the following reasons. Firstly, the procedure is simple, and allows cointegration relationships to be estimated by ordinary least squares (OLS) test once the lag order of the model is identified. A dynamic error correction model (ECM) can be derived from ARDL through a simple linear transformation (Banerjee et al. 1993). Secondly, it does not require unit root test therefore it is applicable irrespective of whether the regressors in the model are purely stationary $I(0)$, purely non-stationary $I(1)$ or mutually cointegrated. Using this procedure, the uncertainty illuminated with pre-testing the order of integration is illuminated. And lastly, the test is relatively more efficient in small samples or finite sample data sizes. The ARDL approach has better small size properties than the widely used Johansen (1988), Johansen and Juselius (1990) and the Engel and Granger (1987) methods of cointegration. The ARDL procedure will however crush in the presence of I(2) series (integrated of order 2).

The ARDL approach involves two steps for estimating the long-run relationship (Pesaran et al., 2001). The first step is to examine the existence of long-run relationships among all variables in an equation and the second step is to estimate the long-run and short-run coefficients of the same equation. We run the second step only in the case if cointegration relationship was found in the first step. The ARDL representation of the tourism demand for Turkey can be written as follows:

$$\Delta \ln TA_{it} = c_0 + c_1 \ln TA_{i(t-1)} + c_2 \ln Y_{i(t-1)} + c_3 \ln RP_{i(t-1)} + c_4 \ln SP_{t-1} + \sum_{j=1}^{m} d_{1j} \Delta \ln TA_{i(t-j)} +$$

$$+\sum_{j=0}^{m} d_{2j}\Delta \ln Y_{i(t-j)} + \sum_{j=0}^{m} d_{3j}\Delta \ln RP_{i(t-j)} + \sum_{j=0}^{m} d_{4j}\Delta \ln SP_{t-1} + \varepsilon_{it} \quad (3)$$

where c_1, c_2, c_3 and c_4 are long run multipliers, m is the number of lags, c_0 is the drift and ε_i are white noise errors, i = 1-13, which are individual estimated countries.

The first step in the bounds testing is to establish whether the dependent and independent variables in each model are cointegrated. The null of no cointegration, i.e. $H_0 : c_1 = c_2 = c_3 = c_4 = 0$ are tested against the alternative of $H_1 : c_1 \neq c_2 \neq c_3 \neq c_4 \neq 0$ for each country. So, we are using the ARDL bounds testing approach to estimate these equations by OLS test in order to test for the existence of long-run relationships among the variables.

We have to conduct a Walt-type (F-test) coefficient restriction test for the joint significance of the coefficients of the lagged variables to test the above null hypotheses H_0. Pesaran et al. (2001) computed two sets of asymptotic critical values for testing cointegration. The first set assumes variables to be I(0), the lower bound critical value (LCB) and the other I(1), upper bound critical value (UCB). If the F-statistic is above the UCB, the null hypothesis of no cointegration can be rejected irrespective of the orders of integration for the time series. Conversely, if the test falls below the LCB the null hypothesis cannot be rejected. Finally, if the statistic falls between these two sets of critical values, the result is inconclusive.

As Pesaran and Pesaran (1997, 305) argues that variables in regression that are ‘in first differences are of no direct interest’ to the bounds cointegration test. Thus, a result that supports cointegration at least at one lag structure provides evidence for the existence of long-run relationship. Alternatively, Kremers et al. (1992) and Banerjee et al. (1998) have demonstrated that in an ECM, significant lagged error-correction term is relatively more efficient way of establishing cointegration. Therefore, the error correction term can be used when the F-test is inconclusive.

The second step is to estimate the long-run coefficients c_1, c_2, c_3 and c_4 of the equation (3) and to select the orders of the ARDL model in 4 variables of interest using Akaike Information Criterion (AIC) or Schwartz Bayesian Criterion (SBC). Finally, the short-run dynamic parameters have to be obtained by estimating an error correction model associated with the long-run estimates. The general error correction model is specified as follows:

$$\Delta \ln TA_{it} = d_0 + \sum_{j=1}^{m} d_{1j} \Delta \ln TA_{i(t-j)} + \sum_{j=0}^{m} d_{2j} \Delta \ln Y_{i(t-j)} + \sum_{j=0}^{m} d_{3j} \Delta \ln RP_{i(t-j)} + \sum_{j=0}^{m} d_{4j} \Delta \ln SP_{t-1} + \lambda_i EC_{i(t-1)} + u_{it} \quad (4)$$

where, d_1, d_2, d_3 and d_4 are the short-run dynamic coefficients of the model's adjustment to equilibrium, λ is the speed of adjustment and EC_i are the residuals obtained from the estimated cointegration equation (3). Finally to ensure that our models pass the stability test we apply the cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests proposed by Brown et al. (1975) to the residuals of the error-correction model (4). These tests are based on the recursive residuals and squared recursive residuals, respectively, of the evaluated model and are plotted against break points. If plots of CUSUM or CUSUMSQ statistics stay within critical bounds of 5 % significance level, the null hypothesis of coefficients' stability in the error correction model can not be rejected.

3.Data Description

The data set of this research includes 13 countries: Austria, Belgium, Bulgaria, Denmark, France, Germany, Holland, Italy, Russia, Sweden, Switzerland, United Kingdom and United States. These countries were chosen on the basis of tourism demand for Turkey. Only countries with the highest number of tourist arrivals who entered Turkey were chosen. Countries for the research were chosen on the basis of minimum 200 thousands tourist arrivals in 2006. Thus the total number of tourists from chosen countries consisted of total about 6 million in 1996 and increased to about 13 million in 2006, composing around 65-70 percent of all tourist arrivals to Turkey (see Table 1). Number of tourists from countries like

Georgia, Iran and Israel every year exceeds 200 thousand as well; however these countries were not included in the research due to the difficulty of the secondary data acquiring from these countries. Monthly data were used covering the period from the January of 1996 to the December of 2006. The monthly statistics on the tourists flow to Turkey were obtained from the Turkish Statistical Institute (TURKSTAT). The data for the Industrial Production Index (IPI) were obtained from the official site of the Organisation for Economic Co-operation and Development (OECD). In literature usually Gross Domestic Product (GDP) is used to measure income, however due to the absence of monthly reports of GDP for many countries, the IPI is used to proxy income. It is quite common to use IPI as the proxy of income in studies based on the monthly data (example, Gonzalez and Moral, 1995; Goh et al., 2008, Seo et al., 2008). The IPI data are used for the income variables of the demand model, where 2000 is the based year. Consumer Price Indexes (CPI) of selected countries are used in calculation of foreign relative price variables and obtained from the OECD site as well. The IPI and CPI data for Bulgaria were obtained from the National Statistical Institute and from the Central Bank of Bulgaria. The nominal exchange rates are the national currencies per new Turkish lira which are used in the calculation of foreign relative price variables as well and are obtained from the central bank of Turkey. Greece was chosen as substitute destination. Greece is one of the best proxies for the substitution destination to Turkey due to its cultural and natural similarities to Turkey. At the same time from Table 1 it can be seen that in 2006 year a lot of chosen countries approximately had the similar number of tourists to both countries. However, some of countries from the list are varying a lot in number of tourist arrivals. Therefore, this is one of our intentions to try to explain reasons for tourists who choose the particular country as their arrival destination. All variables used in the model are measured in log levels.

4.Results and Discussion

In this section we report estimation results of the bounds tests for cointegration between Turkey and 13 countries, share of tourist arrivals from which composed 65 percent from total tourist arrivals in 2006. In the first step equation (3) was estimated to test for the presence of the long-run relationships in the model. The order of the lag distribution on the dependent variables and regressors can be selected by using the AIC or SBC. However, Pesaran and Shin (1999) found that SBC is preferable to AIC due to the difference in the lag selection. SBC selects the smallest possible lag length, while AIC selects the maximum relevant lag length. Therefore in this study SBC is preferred for the lag selection. Equations (3) was estimated using ARDL approach to determine whether the dependent and independent variables in each model are cointegrated. Bahmani-Oskooee and Brooks (1999), Bahmani-Oskooee and Bohl (2000) and Bahmani-Oskooee and Ng (2002) showed in their studies that the results of F-test are sensitive to lag tests at this stage. Therefore F- tests were applied for each first differenced variable by changing the lag lengths from 0 to 4. Results of these estimations are reported in Table 2.

The results of the bounds tests for cointegration show that the calculated F-statistics of all countries except Bulgaria and Russia are higher than the upper-bound critical value 5.61 at the 1% significance level. Thus the null hypothesis of no cointegration can not be accepted in cases of 11 countries with the lag length of 4, implying that there are indeed long-run cointegration relationships amongst the variables. In case of Russia the null hypothesis of no cointegration can be rejected at the 5% significance level. In the case of Bulgaria, F-statistics fall between the lower and upper critical values at 90%. Therefore we can not reject the null hypothesis, but we can not accept it as well. The result in the case of Bulgaria is inconclusive at the order of 1 distributed lag. Therefore following Kremers, et al (1992) significant lagged error-correction term will be the efficient way of establishing cointegration in Bulgaria case.

Based on the results represented in Table 2, we can conclude that there is strong support for long-run tourist demand relationships in the model of Turkey.

Following the establishment of the existence of cointegration, equation (3) was estimated using individual ARDL specifications for every country selected by SBC. The Long-run results are presented in Table 3 where number of tourist arrivals to Turkey *TA* is dependent variable. The estimated coefficients show that tourists' income proxied by industrial production index has very high significant impact on tourism demand for Turkey in most of considered countries with expected positive sign, which confirm positive relations between tourists' income and their demand for Turkey.

Considering the impact of relative prices on the tourism demand, only in cases of five countries relative prices were found to be significant in the tourism demand for Turkey. In cases of Belgium, Bulgaria and Russia with expected negative sign while in cases of Denmark and Switzerland impact of relative prices was found to be highly elastic at the 1% significance level but with opposite positive sign. Positive relative price elasticity in these countries can be explained by "all inclusive" type of tourism which became quite popular in last decade where in the case of advanced payment for the forthcoming holiday effect of price change on the tourism demand can be significantly decreased. It is difficult to examine price elasticity of tourists in the rest of countries as there is not enough evidence on the estimates significance. It means that relative prices in Turkey do not play important role in holiday's decision-making for these countries' tourists.

The long-run cross-price elasticities of the substitution destination Greece were found significant only in cases of Denmark, Sweden and Switzerland with the expected positive sign. The estimated cross-price elasticities in these countries appeared to have significant impact on the tourism demand implying that tourists are aware of differences in prices of Turkey and Greece and these differences are playing important role in selection of holiday destination. The short-run diagnostic statistics from estimation of equation (3) are reported in Table 4. These are tests for serial correlation, functional form, normality and heterosckedasticity. Results show that short-run model in most of cases passes through all diagnostic tests.

The results of the short-run coefficient estimates associated with the long-run relationships obtained from the ECM version of ARDL model equation (4), are presented in Table 5. The ECM coefficient shows the speed of adjustment of variables to long-run equilibrium and should be significant with negative sign. In all 13 cases of countries under investigation error correction coefficient EC(-1) is highly significant at the 1 % with negative sign. These results are ensuring once more that stable long-run relationships among variables in the tourism demand model exist in all considered countries, Kremers, et al (1992), Bannerjee et al (1998). The magnitude of the error correction coefficient is between -0.22 and -0.67 respectively to the individual country. Therefore it implies that disequilibria in tourism demand model is corrected by approximately 22-67 percent every month (respectively to country). This means that steady state equilibrium in the tourism demand model of Turkey can be reached from two to five months, depending on the tourists' origin.

The most significant impact on the tourism demand in the short-run has income, Table 5, as well as in the long run, Table 3. Relative price elasticities of Turkey and cross-price elasticities were found significant only in few countries for the short run, however signs are compatible with long-run coefficients. In the short-run as well as in the long run Denmark and Switzerland have highly significant positive elasticities of relative Turkish prices and substitution prices of Greece.

In other words, when deviations from the long-run equilibrium occur in tourism demand for Turkey, it is primarily the income than relative prices of Turkey and substitution prices of Greece that corrects tourism demand equilibrium in Turkey each month.

Finally to ensure that our models pass the stability test we apply the CUSUM and CUSUMSQ tests proposed by Brown et al. (1975) to the residuals of the error-correction model (4). Graphical results of these tests for Austria and Holland cases are illustrated in Figure 1, graphical results for other countries are not presented here for the space saving. Results of stability tests summarized in table 5 in columns CUS and CUS^2. In most cases plots of CUSUM and CUSUMSQ statistics stay within the critical bounds indicating the stability of estimated coefficients. Thus tourism demand function is staying stable with no regard to the specific lag selection criterion in cases of Austria, Belgium, Denmark, United Kingdom, United States, France, Germany, Sweden and Switzerland. However in some cases it appears that stability is not confirmed by both plots of CUSUM and CUSUMSQ statistics. Plots of both CUSUM and CUSUMSQ statistics are within the critical bounds indicating stability in 9 out of 13 cases. In cases of Bulgaria, Holland, Italy and Russia stability tests appear to be inconclusive.

5.Conclusion

This paper is attempted to find the long-run economic relationships in the tourism demand model for Turkey among variables such as: tourist arrivals, income of tourist generating country, proxied by industrial production index, relative prices of Turkey and relative prices of the substitution destination Greece. The tourism demand for Turkey is measured by tourist arrivals from 13 different countries, which accounts for about 65-70 percent of the total tourist arrivals in Turkey. In this research ARDL model is used in order to measure elasticities of income and relative prices in demand for Turkey from considered countries. Independent variables for the demand model for Turkey were chosen on the basis of previous studies (see Lim, 1999 and Li et al., 2005), where variables such as income of tourist generating country, relative cost of living and relative price of substitute destination were found the most important variables of tourism demand modelling.

The bounds tests suggest that the variables of interest of the tourism demand model are bound together in the long-run. The error correction coefficient appeared to be highly significant with expected sign in all cases, which is confirming the existence of long-run relationships once more. The equilibrium correction is fairly fast and is restored from two to five months in the cases of different studied countries.

The results also indicate that income of tourist generating countries has the most significant impact on the tourism demand in the short-run as well as in the long-run. Relative prices of substitution destination were found significant in the long-run only in Denmark, Sweden and Switzerland. In the short run France joined the above list as well. However elasticity of relative prices for substitute destination in the case of France appeared with negative sign. It can provide evidence that tourists from France are not coming to Turkey for its natural favourable for holiday conditions (extensive sea coast, sun), for them heritage is attraction side. These types of holidays can be chosen in the complex with visits to other neighbouring countries. Finally CUSUM and CUSUMSQ tests confirmed the stability of coefficients in tourism demand model in 9 out of 13 studied countries, indicating no evidence of any structural instability in the tourism demand model.

This study estimated long-run elasticities of the tourism demand model and measured the speed of adjustment to restore long-run equilibrium of the considered model. However, further research on this model would be useful. For example it is planning to generate forecasts for the considered in this paper time-series data.

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Table 1. Analysis of key tourist origin countries for Turkey and Greece

Country	Turkey		Greece
	1996[1]	2006[1]	2006[2]
Austria	232 436	429 708	492 921
Belgium	110 568	451 426	400 219
Bulgaria	139 648	1 177 903	677 368
Denmark	144 059	235 755	325 472
France	251 158	657 859	712 131
Germany	2 119 082	3 762 469	2 267 961
Holland	210 245	997 466	782 154
Italy	158 551	402 573	1 187 598
Russia	1 235 290	1 853 442	261 253
Sweden	162 056	326 255	428 334
Swetzerland	70 608	210 276	280 335
United Kingdom	716 978	1 678 845	2 615 836
United States	344 619	532 404	358 624
Total of chosen countries	5 895 298	12 716 381	10 790 206
Total of all tourists arrivals	8 538 864	19 819 833	17 283 910
Share of chosen countries in total tourist arrivals	69	64	62

Source: [1.] Turkish Statistical Institute and [2.] General Secretariat of National Statistical Service of Greece

Table 2. F-statistics for testing cointegration relationship

Country	Lags	F-statistic	Probability
Austria	4	F(4, 103) = 13.11	0.000**
Belgium	4	F(4, 103) = 18.04	0.000**
Bulgaria	1	F(4, 118) = 2.73	0.042*
Denmark	4	F(4, 103) = 26.09	0.000**
France	4	F(4, 103) = 19.91	0.000**
Germany	4	F(4, 103) = 7.19	0.000**
Holland	4	F(4, 103) = 7.41	0.000**
Italy	4	F(4, 103) = 6.73	0.000**
Russia	4	F(4, 103) = 3.43	0.011**
Sweden	4	F(4, 103) = 25.71	0.000**
Swetzerland	4	F(4, 103) = 5.78	0.000**
United Kingdom	4	F(4, 103) = 30.44	0.000**
United States	4	F(4, 103) = 14.39	0.000**

Notes: Asymptotic critical value bounds are obtained from Table CI case III: unrestricted intercept and no trend for k=3 from Pesaran et al. (2001). They are 2.72-3.77 at 90%, and 3.23-4.35 at 95%. ** and * denote 1% and 5% significance level.

Table 3. Long Run Coefficients using the ARDL approach

Country	**C**	**lnY**	**lnRP**	**lnSP**	**ARDL model**
Austria	5.84 (0.66)	2.25*** (4.16)	-0.55 (0.23)	0.75 (0.32)	ARDL(4,0,0,0)
Belgium	-30.54*** (4.47)	8.04*** (7.97)	-3.55* (1.72)	-2.87 (1.48)	ARDL(4,2,0,0)
Bulgaria	-13.63*** (2.68)	2.43*** (4.74)	-2.47*** (3.32)	-1.10 (1.34)	ARDL(1,0,0,0)
Denmark	32.16*** (3.62)	1.31 (1.09)	7.50*** (4.90)	7.68*** (5.32)	ARDL(4,0,0,0)
France	1.88 (0.14)	4.66*** (2.84)	2.61 (1.13)	3.04 (1.36)	ARDL(4,0,1,1)
Germany	-12.08 (0.69)	5.87*** (3.58)	-1.51 (0.61)	0.18 (0.08)	ARDL(4,0,0,0)
Holland	-62.88*** (4.49)	17.81*** (8.19)	0.52 (0.19)	1.48 (0.54)	ARDL(4,1,0,0)
Italy	-29.64 (1.18)	9.67 (1.54)	0.87 (0.14)	1.28 (0.21)	ARDL(3,0,0,0)
Russia	-8.29** (2.23)	4.32*** (9.77)	-0.55*** (5.83)	-0.19 (0.43)	ARDL(4,0,0,0)
Sweden	10.64 (0.77)	2.54 (0.99)	1.92 (1.13)	2.93** (2.23)	ARDL(4,0,0,0)
Swetzerland	30.82** (2.37)	3.28 (1.62)	5.46*** (3.32)	6.71*** (4.07)	ARDL(4,1,0,0)
United Kingdom	25.94 (0.92)	-2.78 (0.36)	1.97 (1.55)	0.39 (0.25)	ARDL(4,0,0,0)
United States	-7.34 (1.44)	2.89** (2.11)	-0.53 (1.07)	-0.71 (0.89)	ARDL(3,0,0,0)

Notes: Figures in parentheses represent absolute values of t-statistic.

***, ** denote 1% and 5% significance level.

Table 4. The Short-run diagnostic statistics

Country	**LM SC**	**RESET**	**Normality**	**HS**
Austria	χ^2 (1)=0.008[0.930]	χ^2 (1)=0.195[0.659]	χ^2 (2)=1.605[0.448]	χ^2 (1)=0.864[0.353]
Belgium	χ^2 (1)=0.399[0.527]	χ^2 (1)=0.289[0.591]	χ^2 (2)=1.038[0.595]	χ^2 (1)=1.440[0.230]
Bulgaria	χ^2 (1)=2.066[0.151]	χ2 (1)=5.783[0.016]	χ2 (2)=2202.0[.000]	χ^2 (1)=2.027[0.155]
Denmark	χ^2 (1)=8.359[0.004]	χ^2 (1)=1.822[0.177]	χ^2 (2)= 19.393[0.000]	χ^2 (1)=0.254[0.614]
France	χ^2 (1)=6.929[0.008]	χ^2 (1)=1.099[0.295]	χ^2 (2)=0.589[0.745]	χ^2 (1)=0.493[0.483]
Germany	χ^2 (1)=0.246[0.620]	χ^2 (1)=0.009[0.923]	χ^2 (2)=4.779[0.092]	χ^2 (1)=0.058[0.810]
Holland	χ^2 (1)=1.406[0.236]	χ^2 (1)=0.210[0.647]	χ^2 (2)=3.985[0.136]	χ^2 (1)=0.534[0.465]
Italy	χ^2 (1)=0.256[0.613]	χ^2 (1)=0.055[0.814]	χ^2 (2)=0.431[0.806]	χ^2 (1)=1.589[0.207]
Russia	χ^2 (1)=12.650 [0.000]	χ^2 (1)=3.471[0.062]	χ^2 (2)=1.071[0.585]	χ^2 (1)=0.131[0.718]
Sweden	χ^2 (1)=11.398[0.001]	χ^2 (1)=0.012[0.913]	χ^2 (2)=5.803[0.055]	χ^2 (1)=0.695[0.404]
Swetzerland	χ^2 (1)=0.551[0.458]	χ^2 (1)=0.192[0.989]	χ^2 (2)=2.606[0.272]	χ^2 (1)=0.005[0.943]
United Kingdom	χ^2 (1)=25.114[0.000]	χ^2 (1)=0.082[0.775]	χ^2 (2)=7.574[0.023]	χ^2 (1)=0.761[0.383]
United States	χ^2 (1)=4.618[0.032]	χ^2 (1)=1.189[0.275]	χ^2 (2)=0.727[0.695]	χ^2 (1)=0.071[0.790]

Notes: Figures in parentheses represent probabilities. LM is Lagrange multiplier test of residual serial correlation for lag 4 with the null of no serial correlation; RESET is Ramsey's RESET test using the square of the fitted values; Normality is Jarque-Bera statistic used for testing normality; and HS is White's test which is used with the null hypothesis of no heterosckedasticity. All statistics distributed as X^2 with degrees of freedom in parentheses.