Uluslararası Ekonomi ve Yenilik Dergisi, 3 (1) 2017, 35-46

International Journal of Economics and Innovation, 3 (1) 2017, 35-46

Empirical Analysis of the Relationship between Tourist Flows and Exchange Rate Volatility: ARDL Method

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ABSTRACT: *Tourism revenues in Turkey have an important place in the national product. Therefore, increasing tourists flows to increase output can have a positive effect. This paper examines the effects of exchange rate volatility on tourist flows into Turkey for the period of 2003:Q1-2016:Q1. In this paper, it will be investigated whether the exchange rate volatilities are related to long-term co-integration with tourist flows using ARDL method. As a result of this research, long-term co-integration relation was determined between the related variables. The error correction coefficient in the study is -0.0982.*

Keywords: *Exchange Rate Volatility, Tourist Flows, ARDL Method, Turkey.*

Jel Classifications: *C10, F41, L83.*

Turist Akımları ile Döviz Kuru Oynaklığı Arasındaki İlişkinin Ampirik Yönden Analizi: ARDL Yöntemi

ÖZ: *Türkiye'de turizm gelirleri milli hasıla içinde önemli yer tutmaktadır. Dolayısıyla hasıla artışı için turist akımlarının arttırılması olumlu etki yaratabilir. Bu çalışma döviz kurlarındaki oynaklığın Türkiye'ye gerçekleşen turist akımları üzerine etkilerini 2003:Q1-2016:Q1 dönemi için açıklamaktadır. Bu çalışmada ARDL yöntemi kullanılarak döviz kuru oynaklıklarının turist akımları ile arasında uzun dönemli eş bütünleşme ilişkisi olup olmadığı incelenecektir. Yapılan araştırma sonucunda ilgili değişkenler arasında uzun dönemli eş bütünleşme ilişkisi saptanmıştır. Çalışmada hata düzeltme katsayısı -0.0982 olarak hesaplanmıştır.*

Anahtar Kelimeler: *Döviz Kuru Oynaklıkları, Turist Akımları, ARDL Yöntemi, Türkiye.*

Jel Sınıflandırılması: *C10, F41, L83.*

Geliş Tarihi / Received: 11.01.2017 Kabul Tarihi / Accepted: 30.03.2017

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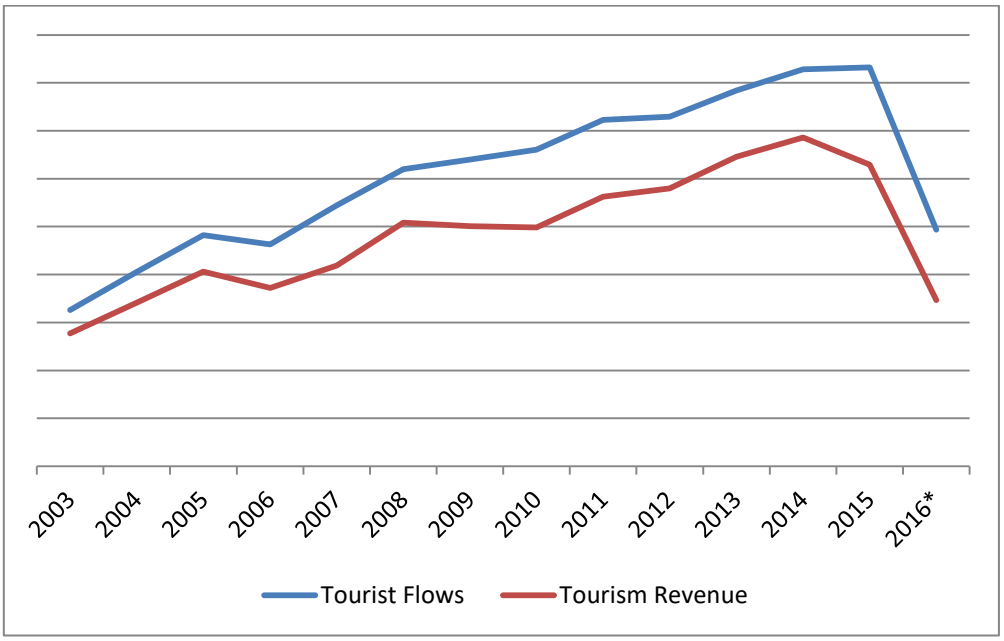
1.Introduction

Especially after World War II, tourist flows have increased rapidly. According to the United Nations World Tourism Organization (UNWTO), international field tourist flows have grown from 400 million people in 1990 to more than 1 billion today.[3] The situation in Turkey is not different. Tourist trends, which amounted to about 16 million people in 2003, exceed 40 milllion people in 2015. In 2016, it is seen that the tourist flows realized in Turkey have decreased considerably.

Graph 1 shows the progress of tourist flows and income for Turkey. Although the Graph covering the years 2003 and 2016 has been recession for some periods, the trend of increase is clearly.

Graph 1: Tourist Flows and Tourism Revenue, 2003-2016



Source: TSI (Turkish Statistical Institute)[4], *; Excludes last quarter data for 2016.

Tourist flows are important not only as visitor but also as tourism incomes. Tourism revenues have a positive impact on the current account deficit. At this point, it is important for Turkey to compensate the current account deficits given to obtain tourism income. When the tourism incomes obtained from TSI are examined, significant increases are seen since 2003. In 2003 about 14 billion $ of tourism revenue was earned. In Turkey more than 30 billion dollars of tourism revenue was earned. However the average per capita spending has declined in spite of the increase in tourist flows and total income. Despite spending an

[3]http://www.e-unwto.org/doi/pdf/10.18111/9789284416899
[4]http://www.e-unwto.org/doi/pdf/10.18111/9789284416899

average of 850 $ per capita in 2003, the spending per capita in 2015 has fallen to 756$. In addition to these indicators, there is no significant change in the average number of tourist arrivals. There may be differences in the composition of the tourist flows that come as a reason for this situation. While tourist flows from African countries have increased about four times and tourists flows from Russia have risen by two times, tourist flows from European countries do not increase at the same proportion.[5]

Tourist security, the state of the global economy and the volatility of exchange rates are the determining factors of tourist flows in a country. Despite the increasing volatility in exchange rates, the increase in tourist coming to Turkey means that Turkey has world standards in tourism. For this reason infrastructure, tourist health and service quality for tourism in Turkey need to be improved (Demirel, et. al., 2008: 3-4).

There is competition between countries, which is about tourist flows. Economic and political stability is the determinant of this competition. Stability refers to the volatility in exchange rates. Exchange rates are influential in the decision of tourists. Since exchange rates volatility depends on economic policies, policymakers should be sensitive in applying economic policies. Because, applied economic policies affect the exchange rate volatility in a tourism country (Agiomirgianakis et al., 2014: 702).

Foreign exchange rate volatility is negatively affected by international financial flows, foreign trade, tourism and investment, it is important to measure and forecast voluntarily. Since the abandonment of the fixed exchange rate system, the exchange rate volatility has increased. The uncertainties associated with exchange rate volatility affect tourism in different forms (Uğuz and Topbaş, 2011: 2).

There are both direct and indirect effects of exchange rate on tourist flows. There are many studies that examine the effects of exchange rate. Exchange rate volatility may reduce tourist flows. The volatility of exchange rates changes both the decision of individual tourists and the decision of tour companies. Because the volatility of exchange rates constitutes a risk factor for tourism (Agiomirgianakis et al., 2014: 702).

In this paper, real effective foreign exchange rates, GDP, tourist flows and CPI data were used. The aim of this study examined the relationship of tourist flows and the exchange rate volatility. In this study, the relationship between exchange rate volatilities and tourist flows was investigated with a unique approach. On the other hand, the fact that the data are current and quarterly contributes to the literature. The structure of the study is as follows. Section 2 examines motivation of paper. Section 3 provides an overview of the literature. Section 4 data description and methodology issues are analyzed. Section 5 concludes results and policy implications derived from findings about study.

[5]http://www.tuik.gov.tr/UstMenu.do?metod=temelist

2. Motivation

Tourism revenues are important for Turkey. Tourist flows are increasing in Turkey especially during summer season. Tourism is important because of the foreign exchange revenue. The purpose of this paper is to examine the effect of the volatility experienced in the intended exchange rates on the tourist flows to Turkey. The relationship between volatility in exchange rates and tourist flows in the study will be examined using the ARDL method. Also the decline in tourist flows to Turkey, especially in 2016, motivates this paper.

3. Literature Review

The study conducted by Toh et al. (1977) for Singapore in 1977 examines the relationship between exchange rate volatility and tourism. They have arrived at the result that the exchange rate has revealed almost all of the tourist trends. Crouch (1994) points out in his paper that exchange rates are effective in explaining tourist flows. Alalaya (2010) explores the variables affecting tourism revenues. There is a long term relationship between tourism revenues, inflation and the exchange rate in this paper. Eliat and Einav (2004) found that the exchange rates are effective in tourist flows.

In Webber's (2001) study exchange rate volatility has been found to affect half of the tourist flows. Quarterly data are used from 1983 to 1997 in Webber's work. Sinclair and Stabler (1997) reveals that low exchange rates can positively affect tourist flows.

In the study of Uğuz and Topbaş (2011), Turkey has a long-term meaningful relationship between exchange rate volatility and tourist flows. They used the 1990-2010 data for the study.

The study by Eugenio-Martin and Morales (2004) reveals that there is no strong relationship between exchange rates and tourist flows. Mervar and Payne (2007) have not found a significant relationship between exchange rate and tourist flows in their study using the ARDL method. Similarly, Demirel et al. (2008) did not find a significant relationship between exchange rates and tourist flows.

According to Narayan (2004), there is a negative relationship between tourist flows and exchange rate volatility. Agiomirgianakis et al. (2014) used quarterly data between 1994 and 2012 in their study on exchange rate volatility and tourist flows in Turkey. There was a negative relationship between exchange rate volatility and tourist flows in the paper. Kaya and Çömlekçi (2013) used monthly data between 2002 and 2011 in their study on exchange rate volatility and tourism revenue. This paper found that negative relationship between exchange rate volatility and tourism revenue.

Karagöz (2016) used the ARCH method. Karagöz examined Turkey in his paper. Karagöz has found that positive shocks are more effective on volatility than negative shocks.

The study conducted by Chang and McAleer (2012) for Taiwan between 1990 and 2008 examines the relationship between price and tourist flows. They have arrived at the result that the effect of price on the tourist flows has differed.

The study by Santana Gallego et al (2010) reveals that exchange rate volatility of zero i.e. has the largest impact on tourist flows. According to study Euro has increased tourist flows by %6.3. The study conducted by Thompson and Thompson (2010) for Greece. The study reveals examined a positive Euro effect because of zero exchange rate volatility.

4. The Model

The model for examining the effect of exchange rate volatility on tourist flows is used also by Agiomirgianakis et al. (2014) to examine the effect of exchange rate volatility on tourist flows. In this paper, the data for the period between the first quarter of 2003 and the first quarter of 2016 is used. Tourist flows data obtained from TSI. The lnT expression used in the paper is the logarithmic expression of tourist flows that come to Turkey to visit and reside in foreign states. Real effective exchange rates (REER) are taken from the data published by Central Bank of Republic of Turkey (CBRT).[6] $lnREER$ is the logarithmic expression of REER. lnV_1 refers to the volatility of exchange rates.In this paper the standard deviation of the moving average of the logarithm of $REER$ as a measure of volatility (lnV_1).CPI data were obtained from IMF and OECD.[7] The variable represented by lnP is the logarithm of the proportions of the CPI's of the domestic CPI and the OECD member countries. GDP data are obtained from IMF data.[8] $lnGDP$ shows the logarithmic shape of quarterly GDP data. In this study all variables are taken in logarithmic form and are free of seasonal effects with Census X-13 method.

4.1. Method

Co-integration tests are used to examine the long-run relationship between variables. Engle-Granger (1987) and Johansen (1988) which are frequently used in the literature argue that a stable combination of two non-stationary sequences at co-integration tests levels is possible. But in these tests the series must be stable at the same level.Therefore this is a major constraint in practice. Fortunately this problem is solved by the ARDL approach which makes it possible to obtain the

[6]http://www.tcmb.gov.tr/wps/wcm/connect/TCMB+TR/TCMB+TR/Main+Menu/Istatistikler/Doviz+Kurlari/Reel +Efektif+Doviz+Kuruu/Veri+%28Tablolar%29
[7]https://data.oecd.org/price/inflation-cpi.htm
[8]http://data.imf.org/?sk=388DFA60-1D26-4ADE-B505-A05A558D9A42

relationship between the integrals from different grades which is proposed Peseran et al. (2001). The advantage of the ARDL model is that the stationary level or stationary state of the first difference does not interfere with the bounds tests. Another advantage of the model is that it can give statistically more reliable results than conventional co-integration tests because it uses unconstrained error correction model. The most important advantage of the model is that it contains information about the short and long term situations between series (Akel and Gazel, 2014: 30-31).

Cointegration analysis is performed is using the following equation is first created;

$$lnT = c_0 + c_1 lnV_1 + c_2 lnP + c_3 lnGDP + \varepsilon_i \quad (1)$$

For the ARDL test approach, the unrestricted error correction model is shown in equation (2)

$$lnT_t = c_0 + \sum_{i=1}^{m} \beta_{1i}\, lnT_{t-i} + \sum_{i=0}^{n} \beta_{2i} lnV_{1_{t-i}} + \sum_{i=0}^{p} \beta_{3i} \Delta lnP_{t-i} + \sum_{i=0}^{r} \beta_{4i} \Delta lnGDP_{t-i} + \delta_1 lnT_{t-i} + \delta_2 lnV_{1_{t-i}} + \delta_3 lnP_{t-i} + \delta_4 lnGDP_{t-i} + \varepsilon_i \quad (2)$$

In the (2), Δ is the symbol of difference operator, c is the symbol of fixed term, ε_i is the symbol of error term. Once the regression in equation (2) has been estimated the existence of a long-term relationship should be tested and the Wald Test is used. The hypothesis of this test is as follows;

$$H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$$
$$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0 \quad (3)$$

The calculated F-statistic is compared with the asymptotically derived significance levels in the studies of Peseran et al. (2001). If the F-statistic is above the critical value H_0 is rejected and is the result of co-integration.

The long-term coefficients are estimated after testing the existence of the co-integration relationship. In order to make this prediction, ARDL (m, n, p, r) model which is in equation (4) is formed;

$$lnT_t = c_0 + \sum_{i=1}^{m} c_{1i}\, lnT_{t-i} + \sum_{i=0}^{n} c_{2i} lnV_{1_{t-i}} + \sum_{i=0}^{p} c_{3i}\Delta lnP_{t-i} + \sum_{i=0}^{r} c_{4i}\Delta lnGDP_{t-i} + \varepsilon_i \quad (4)$$

After determining the coefficients of the long-term relationship, the suitably of the model is determined by looking at the model's diagnostic tests. An ARDL based error correction model is used to identify short-run relationships between variables.

$$lnT_t = c_0 + \sum_{i=1}^{m} \lambda_{1\mathrm{i}}\, lnT_{t-i} + \sum_{i=0}^{n} \lambda_{2i} lnV_{1_{t-i}} + \sum_{i=0}^{p} \lambda_{3i}\Delta lnP_{t-i} + \sum_{i=0}^{r} \lambda_{4i}\Delta lnGDP_{t-i} + \lambda_{5i} ECM_{t-1} + \varepsilon_i \quad (5)$$

In the (5) equilibrium, $ECM$is the symbol of error correction coefficient. This term refers to a lagged value of the model's long-term relationship between variables. The coefficient ECM expression indicates how much of a short-term shock will disappear in the long-term (Paseran, et al., 2001).

4.2. Results

When the ARDL co-integration test is performed, firstly the stationarity of the series should be considered. In this paper, unit root tests developed by Phillips-Perron (1988) are used. It is tested whether they are stationary in their level or they are stationary in their first difference. Stability results of the series tested by the PP test are shown in Table 1.

Table 1: Phillips-Perron Unit Root Test Results

Series	Level	1st Diffirences
lnT	-3.640*	-8.371*
lnV_1	-3.296*	-6.966*
lnP	0.056	-7.901*
$lnGDP$	-1.795	-4.401*

Note: *: denotes significance at least at %5 level

Table 1 shows the PP test results. The level of $lnGDP$ was calculated as -17.795 and the first difference value as -4.401. In this case, it seems that $lnGDP$ is stationary in the first difference.The level of lnP was calculated as 0.056 and the first difference value of lnP was calculated -7.901.So lnP is stationary at the first difference. lnV_1 and lnT is stationary at their level value.

Co-integration testing can be performed using Auto Regressive Distrubuted Lag Models (ARDL) model following PP unit root tests. In this context, the data are included in the model by determining the appropriate number of lags. Before applying the co-integration test, the bounds tests should be performed and its results evaluated. Table 2 shows the bounds tests results of the model.

Table 2: Bounds Test Results

	ARDL order	**F-statistics, Wald Bounds Tests**
lnT	(2, 0, 0, 0)	5.1005
Significant Level	**Lower Bound**	**Upper Bound**
%1	4.29	5.61
%5	3.23	4.35
%10	2.72	3.77

The Wald bounds test was performed and its results are reported in Table 2. According to the computed F-statistic which is higher than the appropriate upper bound of the critical value shown in Table 2, the null hypothesis of no co-integration is rejected and the alternative hypothesis is adopted, concluding that there is a long-term relationship between the variables. In other words, H_0 is rejected because the bound F-statistic value calculated as 5.1005 is greater than the upper limit value at the %5 significance level when compared with the critical values.

In Table 3, the diagnostic test result of model given. Accordingly any Autocorrelation (Breusch-Godfrey LM Test), heteroscedasticity (ARCH LM Test). The problem is not found the error term is normal distribution (Jarquera-Bera Normality Test).

Table 3: ARDL (2, 0, 0,0) Model Diagnostic Test

R^2	0.9931
Adjusted R^2	0.9915
F-statistic	598.6784 (0.000)
Breusch-Godfrey LM	0.181522 (0.8348)
ARCH LM	0.390096 (05355)
Jarquera-Bera Normality	1.896726 (0.387375)

The first step of the ARDL model is to determine the appropriate delay length. In this paper the optimal delay length, the minimum AIC value was taken into consideration as 5. There is no serial correlation and heteroscedasticity problem in the model according to the probability of serial correlation and varying variance test statistical results. For the implementation of the ARDL method, F statistic value must first be determined.

After performing that there is a co-integrating relationship, the coefficient of the Error Correction Coefficient ECM and its statistical significance was performed and shown in Table 4. The ECM should be negative and statistically significant.

Table 4: Error Correction Model

Series	**Coefficients**	**Standart Error**	**t-statistic**	**Prob**
lnV_1	-0.0748	0.0984	-2.3981	0.0207
lnP	-1.6852	1.0376	-1.6240	0.1114
$lnGDP$	0.4367	0.3275	1.3335	0.1891
ECM	-0.0982	0.0260	-3.7719	0.0005

In our model, the sign of the ECM coefficient is, as expected, a negative value and is statistically significant. Its value -0.0982 shows that any disequilibrium between the variables is corrected in less than a period.

5. Conclusion

Turkey is an important country in terms of tourism revenues. In recent years, tourism revenues constitute more than 4 percent of the country income. The income from tourism is also about a twenty percent of total exports.[9] It is difficult source of income to be abandoned in terms of the goods that tourism has created.

The relationship between the volatility of the exchange rates and the tourist flows in this paper is examined by means of the ARDL co-integration method. It is seen that in the related years, the variables have long-term co-integration relationships and that the effect of short-term shocks corrected in a longer period than a period. For this reason, exchange rate volatilities should be minimized in order to tourist flows policies to have positive outcomes. Structural reforms must therefore be made in order to strengthen the independence of the central bank.

The shock effect that occurs in exchange rate volatilities has influenced tourist flows for a longer period of time. According to which Turkey is worse than the rest of the world in terms of tourism services. Structural reforms should be applied for this and well educated people should be trained for the tourism sector. The necessary infrastructure for tourism should also be provided. In this context various incentives should be applied to the tourism sector. Public spending should be made to ensure the safety of tourists and to improve health services for tourists.

References

Agiomirgianakis, G., Serenis, D. and Tsounis, N. (2014), "Exchange Rate Volatility Tourist Flows into Turkey", *Journal of Economic Integration,* 29(4), 700-725.

Akel V. and Gazel, S. (2014), "Döviz Kurları ile BIST Sanayi Endeksi Arasındaki Eşbütünleşme İlişkisi: Bir ARDL Sınır Testi Yaklaşımı", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 44, 23-41.

Alalaya. M. M. (2010), "Short and Long Terms through Co Integration and GARCH Models Applied to Jordan Tourism Income: (1976-2008)", *European Journal of Economics, Finance and Administrative Sciences,* 19, 134-145.

Chang C. and McAller, M. (2012), "Aggregation, Heterogeneous Autoregression and Volatility of Daily International Tourist Arrivals and Exchange Rates", *The Japanese Economic Review,* 63(3), 397-419.

Crouch G. I. (1994), "The Study of International Tourism Demand, A Review of Findings", *Journal of Travel Research,* 33, 12-23.

[9]http://www.tursab.org.tr/tr/turizm-verileri/istatistikler/turizmin-ekonomideki-yeri/gsmh-icindeki-payi-1963-_79.html

Demirel, B., Bozdağ E. G. and İnci, A. G., (2008), "Döviz Kurlarındaki Dalgalanmaların Gelen Turist Sayısına Etkisi: Türkiye Örneği", *Dokuz Eylül Üniversitesi Ulusal İktisat Kongresi, İzmir,* http://debis.deu.edu.tr/userweb//iibf_kongre/dosyalar/demirel.pdf, (Date of Access: 21.10.2016).

Eliat, Y. and Einav, L. (2004), "Determinants of International Tourism: A Tree Dimensional Panel Data Analysis", *Applied Economics*, 36, 1315-1327.

Eugenio-Martin and Morales, (2004), "Tourism and Economic Growth in Latin American Countries: A Panel Data Approach", *Nota Dı Lavoro,* 1-28.

Karagöz, K. (2016), "Turist Akımında Oynaklığın ARCH Modelleriyle Ölçülmesi: Türkiye Örneği", *Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9, 131-141.

Kaya, V. and Çömlekçiler, S. Ç. (2013), "The Effects of Exchange Rate Volatility to Tourism Sector: The Case of Turkey", *Journal of Travel Hospitality Management,* 10(2), 82-89.

Mervar, A. and Payne, J. (2007), "Analysis of Foreign Tourism Demand for Croatian Destinations: Long Run Elasticity Estimates", *Tourism Economics,* 13, 7-20.

Narayan, P. K. (2004), "Economic Impact of Tourism on Fiji's Economy: Empirical Evidence from the Computable General Equilibrium Model", *Tourism Economics,* 10, 19-33.

Paseran, M. H., Shin, Y. and Smith, R. J. (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics,* 16, 289-326.

Phillips, P. C. and Peron, P. (1988), "Testing for A Unit Root in Time Series Regression", *Biometrika,* 75(2), 335-346.

Santana, Gallego M., Ledesma, Rodriguez F. J. and Perez, Rodriguez V., (2010), "Exchange Rate Regimes and Tourism", *Tourism Economics,* 16, 25-43.

Sinclair, M. T. and Stabler, M. (1997), *The Economics of Tourism*, London, UK: Routledge.

Thompson, A. and Thompson, H. (2010), "The Exchange Rate Euro Switch and Tourism Revenue in Greece", *Tourism Economics*, 16, 773-780.

Toh, R. S., Khan, H. and Ng F. T. (1997), "Prospects for the Tourism Industry in Singapore: A Regression Model", *Cornell HRA Quarterly,* 38, 80-87.

Uğuz, S. Ç. and Topbaş, F. (2011), "Döviz Kuru Oynaklığı Turizm Talebi İlişkisi: 1990-2010 Türkiye Örneği", *Anadolu International Conference in Economics II.*

Webber, A. (2001), "Exchange Rate Volatility and Cointegration in Tourism Demand", *Journal of Travel Research*, 39(4), 398-405.

http://data.imf.org/?sk=388DFA60-1D26-4ADE-B505-A05A558D9A42, (Date of Access: 21.10.2016).

http://www.e-unwto.org/doi/pdf/10.18111/9789284416899 (Date of Access: 21.10.2016).

http://www.tcmb.gov.tr/wps/wcm/connect/TCMB+TR/TCMB+TR/Main+Menu/Istatistikler/Doviz+Kurlari/Reel+Efektif+Doviz+Kuruu/Veri+%28Tablolar%29, (Date of Access: 21.10.2016).

http://www.tuik.gov.tr/UstMenu.do?metod=temelist, (Date of Access: 21.10.2016).

http://www.tursab.org.tr/tr/turizm-verileri/istatistikler/turizmin-ekonomideki-yeri/gsmh-icindeki-payi-1963-_79.html, (Date of Access: 17.12.2016).

https://data.oecd.org/price/inflation-cpi.htm, (Date of Access: 21.10.2016).