THE EFFECT OF REAL EFFECTIVE EXCHANGE RATE AND NUMBER OF FOREIGN VISITORS ON TOURISM INCOME IN TURKEY: COINTEGRATION AND CAUSALITY ANALYSIS (2005-2019)

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Abstract: Tourism is a field of activity called the "smokeless factory" with rough description, which has an important place in development and employment policies. Moreover, tourism income is an important item in the foreign exchange inflow of countries and thus in closing the current deficit caused by foreign trade deficit. For this reason, it has become one of the sectors in our country which has become increasingly important and encouraged for its development in recent years. In this study,effect of the number of foreign visitors and exchange rate which are the determinants of tourism income on tourism income is examined empirically. In the research, quarterly datas of tourism income, the number of visitors and real effective exchange rate are used. As a result of Johansen cointegration analysis, long-term cointegration relationship has been determined between the series. It has been found that the number of visitors has positive and significant, the real effective exchange rate has negative and significant effect on tourism incomes. In the vector error correction model established after the cointegration relationship, the error correction coefficient is negative but not statistically significant. As a result of Granger causality analysis; two-way causality relations between real effective exchange rate and tourism income, one-way causality relations from visitor number towards real effective exchange rate direction have been detected. As a result, it has been revealed that increasing the number of visitors is an important factor in increasing tourism incomes, and that changes in the exchange rate affect tourism income.

Key words: Tourism income, the real effective exchange rate, the number of visitors

INTRODUCTION

Tourism is one of the most important sources of income in countries which have natural and historical beauty. In addition to being an alternative to agricultural and industrial activities in growth, tourism is also an alternative to foreign trade activities in terms of foreign currency inflows to the country. Further, tourism has an important role in reducing the country's unemployment due to its employment potential.

Turkey has a wide variety of tourism resources. For this reason, resources should be evaluated in the best way and these resources should be brought into Tourism. Thanks to the areas provided for tourism, the number of visitors to the country, and therefore employment and income, is expected to increase. In order to sustain this income, there

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is a need for a tourism diversification that can reduce the seasonal effect in tourism activities, create alternative tourism areas for marine tourism and allow the guests to spend more time outside the hotel and spend money.

In this study, the number of foreign visitors, one of the major determinants of tourism revenues, and the effect of the real effective exchange rate index on tourism revenues, in which the average value of the Turkish Lira against the currencies of the countries that have a significant share in Turkey's foreign trade adjusted to real terms by removing the relative price effect is examined. Accordingly, it is possible to see the relationship between the nominal exchange rate and the real effective exchange rate in the graph in Figure 1.

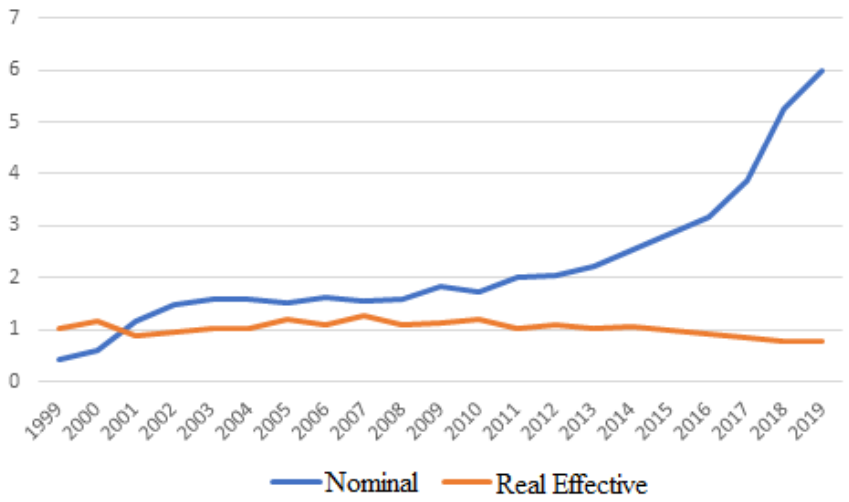


Fig. 1. The nominal Exchange Rate and The Real Effective Exchange Rate

The national currency depreciates as the exchange rate rises according to the nominal exchange rate. However, the real effective exchange rate is the opposite. The increase in the real effective exchange rate means the appreciation of the national currency. From this point of view, it should be emphasized that there is a negative relationship between the two exchange rates.

LITERATURE REVIEW

Aktas (2005), tried to put forward the determinants of tourism income by performing multiple regression analysis with the data of 1998-2000 period. According to the results of the analysis which includes many variables, the most important factors affecting tourism revenues are the number of variables of travel agency and tourist.

Bahar (2006), examined the effect of tourism revenues on growth with VAR analysis. As a result of the study, the existence of a reciprocal relationship between the two variables was determined.

Belloumi (2010), used Granger causality analysis to reveal the relationship between tourism revenues and real effective exchange rate for Tunisian economy. As a result of the study, no causal relationship was found between real effective exchange rate and tourism revenues.

Kara et al. (2012), have examined the relationship of tourism revenues to macroeconomic aggregates with data the period 1992-2011 by using Granger causality analysis. As a result of the study, one-way causality relationship was determined from the real exchange rate to the direction of tourism revenues.

Uguz and Topbas (2012), examined the relationship between tourism demand and exchange rate and exchange rate volatilities with the data of 1990-2010 period. As a result of the cointegration test, exchange rate volatility has a positive effect on tourism demand.

Erkan et al. (2013), examined the determinants of tourism revenues for the Turkish economy with data from 2005-2012. As a result of causality analysis, it was determined that there is no causality relationship between the real exchange rate variable and the number of tourists, although there is a two-way causality relationship between tourism revenues and the number of tourists.

Tang (2013) analyzed the relationship between tourism income and real effective exchange rate for the Malaysian economy with ARDL and Granger causality test. The analysis revealed a positive relationship in the long term and a one-way causality relationship in the short term from the real effective exchange rate to tourism income.

Sen and Sit (2015), analyzed the monthly data for the period 2000-2012 using Toda-Yamamato method in their study examining the effect of the real exchange rate on Turkey's tourism revenues. As a result of the study, causality relationship between tourism revenues and real exchange rates in the short, long and medium period and between real exchange rates and tourism revenues in the long term was observed.

Ozcan (2015), tested determinants of tourism revenues in Turkey via a panel data analysis method with data covering the years 1995-2011 of the 20 countries that sent the most tourists to Turkey. The results of the study showed that the gross domestic product of the countries sending tourists, the real exchange rate in Turkey and the political stability have a positive effect on tourism revenues.

Aydin et al. (2015) conducted a panel data analysis with data from the 5 countries that sent the most tourists to Turkey to determine the determinants of international tourism demand. The analysis found a negative relationship between tourism prices and tourism demand and a positive relationship between exchange rate and tourism demand.

Oncel et al. (2016), examined the relationship between real exchange rate and tourism revenues in Turkey with the Toda-Yamamato test for the period 2002-2015. As a result of the study, one-way causality relationship was determined between the series, from tourism revenues to the real exchange rate direction.

DATA SET AND METHODOLOGY

The data set used in this study covering the period 2005q:1-2019q:2. The number of visitors (LGUEST), tourism income (LREVENUE) and real effective exchange rate (LREER) data used in econometric analysis were compiled from the Turkish Central Bank electronic data distribution system. The number of visitors and tourism revenue series are seasonally adjusted by Tramo-Seat method. The tourism revenue data has been realised with CPI 2003:100 data. All variables were added in the model after logarithmic transformation.

Since there will be a false regression problem in the analysis of non-stationary series (Granger and Newbold, 1974: 111), it is necessary to determine the stationary level first. Augmented Dickey-Fuller (ADF) and Philips-Perron (PP) unit root tests are used for determination of stationary level. In order to apply Johansen cointegration test, the first of the series must be stationary at first difference. The VAR model was established for the determination of the cointegration relationship. After that the optimum lag length was determined and then it was investigated whether this lag length model had stability, autocorelation and heteroskedasticity problems. After the Johansen cointegration test, The vector error correction model and granger causality tests based on this model were applied.

Empirical Findings

Unit root test results are given in Table 1.

Table 1. ADF and PP Unit Root Tests Results

Variables	Levels				First Differences			
	Constant		Constant with trend		Constant		Constant with trend	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP
LREVENUE	0.314	-0.159	-1.364	-1.786	-6.218*	-6.281*	-6.494*	-6.501 *
LREER	-0.796	-0.796	-2.733	-2.600	-8.589*	-9.017*	-8.698*	-11.922*
LGUEST	-1.004	-0.816	-2.384	-2.109	-5.829*	-5.842 *	-5.778*	-5.791*
Critical Values								
%1	-3.550		-4.127		-3.552		-4.130	
%5	-2.913		-3.490		-2.914		-3.492	
%10	-2.594		-3.173		-2.595		-3.174	

Note: *,implies significance at the 1% level.

According to the ADF and PP tests results; all variables contain unit roots in the level values. When the first differences are taken, they are all stationary at the level of 1% significance.

After determining the level of stationary, the VAR model is established to estimate the optimal lag length. Akaike (AIC), Schwarz (SCI) and Hannan-Quinn (HQ) information criterions are used to determine the lag length. Lag length estimation results are given in Table 2.

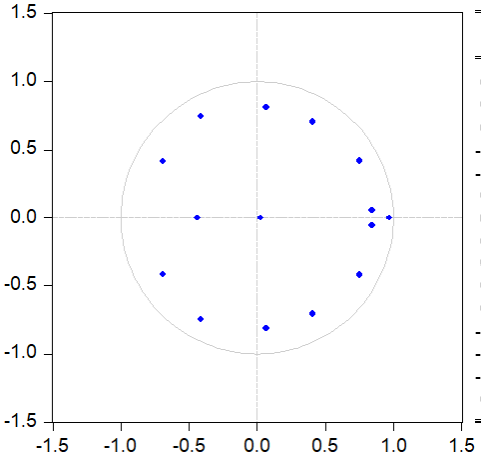
Table 2. Optimal Lag length Estimation Results

Lag	FPE	AIC	SC	HQ
0	7.66e-07	-5.568996	-5.452046	-5.524800
1	3.21e-08*	-8.742344	-8.274544*	-8.565562*
2	3.71e-08	-8.602281	-7.783630	-8.292912
3	3.52e-08	-8.667684	-7.498184	-8.225728
4	4.06e-08	-8.546488	-7.026137	-7.971945
5	3.26e-08	**-8.804400***	-6.933199	-8.097270
6	4.07e-08	-8.640355	-6.418303	-7.800638
7	4.72e-08	-8.577030	-6.004128	-7.604727
8	6.09e-08	-8.439897	-5.516146	-7.335007
9	6.45e-08	-8.548054	-5.273452	-7.310577
10	7.49e-08	-8.626904	-5.001452	-7.256841

Note: *, indicates lag order selected by the criterion.
AIC: Akaike Informaton Criterion, SC: Schwarz Informaton Criterion, HQ: Hannan-Quinn Informaton Criterion

According to the Table 2., while SC and HQ information criterions indicate 1 lag for optimal lag length, the 5 lags pointed out by the Akaike information criterion is considered to be the optimal lag length.

Then, it is investigated whether the model carries the stability, autocorrelation and heteroskedasticity problems at the determined lag length. The results of the stability tests are reported in Figure 2.



Root	Modulus
0.971129	0.971129
0.747400 - 0.421923i	0.858269
0.747400 + 0.421923i	0.858269
-0.415477 - 0.746892i	0.854675
-0.415477 + 0.746892i	0.854675
0.841597 - 0.059186i	0.843675
0.841597 + 0.059186i	0.843675
0.405251 - 0.706989i	0.814900
0.405251 + 0.706989i	0.814900
0.065281 - 0.811938i	0.814638
0.065281 + 0.811938i	0.814638
-0.691966 - 0.416711i	0.807754
-0.691966 + 0.416711i	0.807754
-0.439301	0.439301
0.027588	0.027588

Fig. 2. The Results of the Stability Tests

According to the Figure 2., the fact that the inverse roots of the AR characteristic polynomial are located within the unit circle and that the module values in the table are less than 1 indicates that there is no stability problem in the model.

Table 3. Otocorrelation LM Test Results

Lag	LRE* stat	df	Prob.
1	7.600307	9	0.5749
2	11.92186	9	0.2178
3	4.962907	9	0.8375
4	7.029633	9	0.6340
5	4.729686	9	0.8572
6	7.226130	9	0.6136
H_0: No serial correlation, H_1: There is serial correlation			

According to the results in Table 3, the hypothesis H0, which states that there is no autocorrelation between the series, is accepted.

Table 4. White Hetoroskedasticity Test

Chi-sq	df	Prob.
203.2695	180	0.1128
H_0: No Hetoroskedasticity. H_1: There is Hetoroskedasticity.		

According to the variance test result in Table 4; hypothesis H0, which states that there is no hetoroskedasticity, is accepted.

After providing the necessary preconditions, Johansen cointegration test, Vector error correction model and Granger causality test based on this model are applied after determination of cointegration relationship.

Table 5. Johansen Cointegration Test Results

Hypothesized No. of CE(s)	Trace Statistic	0.05 Critical Value	Prob.**	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	**35.01631**	**29.79707**	**0.0114**	18.02725	21.13162	0.1288
At most 1 *	**16.98906**	**15.49471**	**0.0296**	**16.84452**	**14.26460**	**0.0191**
At most 2	0.144540	3.841466	0.7038	0.144540	3.841466	0.7038

Note: * shows that the H0 hypothesis, which indicates that there is no cointegration relation, is rejected at a 95% significance level.

According to the results in Table 5, the null hypothesis stating that there is no cointegration relation is rejected at 95% significance level. Trace statistic results 2, Maximum eigenvalue statistics results 1 show the existence of a cointegration vector. Normalized cointegration coefficients are given in Table 6.

Table 6. Normalized cointegrating coefficients (standard error in parentheses)

LREVENUE	LREER	LGUEST
1.000000	1.290676	-0.262742
	(0.22972)	(0.16451)

According to the results in Table 6, the correlation coefficients are statistically significant and in agreement with the theory. While the increase of 1% in the number of guests caused an increase in revenue of 0.26%, the increase of 1% in the real effective exchange rate caused a decrease in revenue of 1.29%.

Vector Error Correction Model (VECM) and Granger Causality analysis based on long and short term causality between variables that are in the cointegration relationship in the long run were performed. The results are reported in Table 7.

Table 7. Granger Causality Analysis Based on VECM

Dependent Variable	Independent Variable			ECT_{-1} Coefficient (p-value)
	χ^2 -statistics of lagged 1st differenced term			
	ΔLREVENUE	ΔLREER	ΔLGUEST	
ΔLREVENUE	-	9.937**	3.936	-0.080
		(0.041)	(0.414)	(0.278)
ΔLREER				
	14.14*	-	9.168***	
	(0.006)		(0.057)	
ΔLGUEST	6.046	1.504	-	
	(0.19)	(0.825)		
Note: *, ** and *** indicate that the null hypothesis that there is no causality relationship is rejected at 99%, 95% and 90% significance levels, respectively.				

When the results in Table 7 are examined, it is seen that the sign of error correction coefficient is negative but not statistically significant. In this case, it is stated that the error correction mechanism does not work and there is no causal relationship between the variables in the long run.

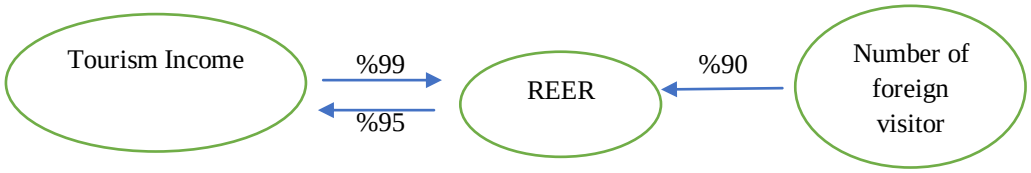


Fig. 3. Causality Relation

As a result of the short-term Granger causality test; The two-way causality relationship has been determined at 95% significance level from real effective exchange rate towards tourism income and at 99% significance level from tourism incomes to real effective exchange rate. In addition, a one-way causality relationship with a 90% significance level has been determined from the number of foreign guests to the real effective exchange rate.

CONCLUSION

Tourism is one of the important income sources in today's economies. In this study, the effects of foreign visitors and exchange rate, which are important determinants of tourism income, on tourism income have been investigated.

As a result of the empirical examination; In the long run, a positive correlation between the number of foreign visitors and tourism revenues and a negative relationship between real effective exchange rate (increase in real effective exchange rate means appreciation of local currency, depreciation of foreign currency).

In the short term, two-way causality relations between exchange rate and tourism revenues, and one-way causality relations from the number of foreign guests to the direction of real effective exchange rate have been determined. According to this result, the country's tourism income affects the exchange rate and the exchange rate affects the tourism income. It is also concluded that foreign visitors to the country have an effect on determining the exchange rate.

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