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THE EFFECT OF REAL EFFECTIVE USD/TRY EXCHANGE RATE ON TOURISM INCOME: AN EMPIRICAL ANALYSIS OF TURKEY

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ABSTRACT

The exchange rate is one of the most important factors affecting the travel costs of tourists. Therefore, the depreciation of the national currency makes tourist travel cheaper. Similarly, the appreciation of the national currency makes travel more expensive for tourists. From this point of view, this study aims to seek the effects of real effective USD/TRY exchange rate on tourism income and average tourism expenditure per capita for the period 2003Q1-2019Q4. In the empirical analysis, the Granger causality test was used to examine the relationship between the variables. According to the results of the study, a bilateral Granger causality relationship was determined between the real effective USD/TRY exchange rate and the average tourism expenditure per capita. However, Granger causality could not be determined between the real effective USD/TRY exchange rate and tourism income. Afterwards, variance decomposition and impulse-response functions analyses were performed to support the results obtained from the Granger causality test. According to the results of the variance decomposition analysis, the ratio of the average tourism expenditure per capita in Turkey to be explained by tourism income and real effective exchange rate is quite high.

Contribution/Originality: The results of the analysis reveal that the level of exchange rates should be taken into account in the policy making process and policies that reduce exchange rate volatility should be implemented for the development of the tourism sector, thus providing information to policy practitioners.

1. INTRODUCTION

In the international markets, the disappearance of borders between countries affects open economies and thus economic transaction volumes. In terms of international trade, the value of the national currency of the countries in the international markets emerges as an important issue. Therefore, policy practitioners in Turkey started to give more importance to the movements of the Turkish Lira (TL) against the US Dollar and Euro (Sevim & Oğan, 2020) and to make direct and indirect central bank interventions to protect the value of the TL against foreign currencies and reduce volatility. The level of exchange rates is an important indicator also for the tourism sector. The exchange rate levels of the countries they visit play an important role in calculating the travel costs of tourists. The relationship between exchange rates and tourism arises as a result of the depreciation of the national currency of the country to be visited, making the travels of foreign visitors cheaper.

On the other hand, the increase in employment and in foreign exchange reserves as a result of tourism activities creates a positive effect on the balance of payments. In addition, tourism is very important for the country's economy in terms of increasing production diversity and international relations. From this point of view,

this study aims to ascertain the effects of real effective USD/TRY exchange rate on tourism income and average tourism expenditure per capita for the period 2003Q1-2019Q4. It is expected that the study will contribute to the literature in terms of the analysis with current data and the applied methods, and the findings obtained as a result of the study will contribute to the policy-making process for the development of the tourism sector.

The study is organized as follows: Evaluating the current data of the tourism income in Turkey in the second part; summarizing the studies in the related literature in the third part; giving information about the econometric model and data set in the fourth part; and evaluating the results of the analysis and giving policy recommendations in the last part.

2. TOURISM INCOME IN TURKEY

Being a bridge between Asia and Europe, its cuisine diversity, its beaches on the Mediterranean and its historical richness all increase Turkey's tourism potential. Turkey is among the countries that attract the most tourists in recent years.

In Table 1, total tourism income and average tourism expenditure per capita in Turkey in quarterly periods between 2003-2021 are given. According to Table 1, it is observed that total tourism income, which increased from the beginning of 2003 until 2015, experienced a decline in 2015. The tension that emerged between Turkey and Russia after the crash of the Russian jet in November 2015 caused a great decrease in the number of Russian tourists, especially in the summer months of 2016. In addition, the geopolitical risks created by the Syrian civil war in the region and the increase in security concerns after the attacks in Turkey led to a decrease in the number of foreign tourists. Thereby, the decrease in Turkey's total tourism income deepened even more in 2016. Afterwards, tourism income entered a recovery process in 2017 and started to rise again. However, this recovery process was interrupted by the Covid-19 pandemic announced in March 2020, countries closed their borders and tourism income decreased by 65% compared to the year 2019.

Table 1. Tourism income and average tourism expenditure per capita in Turkey: 2003-2021.

Year	Tourism Income				Average tourism expenditure per capita		
	Period	Total (million $)	Foreigner (million $)	Citizen (resident abroad) (million $)	Total ($)	Foreigner ($)	Citizen (resident abroad) ($)
2003	Annual	13 855	10 141	3 600	850	740	1 384
	I	1 262	845	409	742	620	1 207
	II	2 365	1 945	405	742	679	1 266
	III	7 367	5 141	2 162	976	839	1 521
	IV	2 861	2 210	624	740	661	1 199
2004	Annual	17 077	13 061	3 863	843	759	1 262
	I	1 829	1 321	494	796	708	1 145
	II	3 512	3 010	467	740	696	1 105
	III	8 204	5 967	2 164	934	830	1 353
	IV	3 532	2 764	738	797	722	1 217
2005	Annual	20 322	15 726	4 374	842	766	1 214
	I	2 195	1 620	552	769	682	1 150
	II	4 218	3 631	536	717	680	982
	III	9 811	7 297	2 409	955	863	1 320
	IV	4 098	3 178	877	803	730	1 169
2006	Annual	18 594	13 919	4 464	803	722	1 153
	I	2 192	1 507	663	801	705	1 111
	II	4 100	3 388	661	740	690	1 050
	III	8 839	6 510	2 237	872	784	1 217
	IV	3 463	2 514	903	732	641	1 117

Year	Tourism Income				Average tourism expenditure per capita		
	Period	Total (million $)	Foreigner (million $)	Citizen (resident abroad) (million $)	Total ($)	Foreigner ($)	Citizen (resident abroad) ($)
2007	Annual	20 943	15 936	4 704	770	692	1 121
	I	2 425	1 683	697	760	659	1 090
	II	4 263	3 535	650	657	612	915
	III	9 845	7 385	2 333	829	743	1 209
	IV	4 410	3 333	1 024	779	702	1 115
2008	Annual	25 415	19 612	5 418	820	742	1 191
	I	3 162	2 292	821	849	764	1 131
	II	5 520	4 635	777	724	679	974
	III	11 506	8 731	2 608	862	774	1 259
	IV	5 227	3 955	1 212	833	743	1 271
2009	Annual	25 065	19 064	5 691	783	697	1 222
	I	2 851	2 086	725	784	709	1 046
	II	5 076	4 209	787	656	603	1 033
	III	11 103	8 359	2 614	811	722	1 228
	IV	6 034	4 409	1 565	871	753	1 455
2010	Annual	24 931	19 110	5 558	755	670	1 231
	I	2 865	2 097	729	763	675	1 130
	II	5 499	4 495	937	657	588	1 273
	III	10 174	7 821	2 259	734	666	1 066
	IV	6 393	4 698	1 633	908	780	1 606
2011	Annual	28 116	22 222	5 63	778	709	1 168
	I	3 737	2 751	945	850	764	1 183
	II	6 600	5 579	949	707	656	1 137
	III	11 314	8 996	2 224	755	702	1 024
	IV	6 465	4 897	1 521	871	765	1 488
2012	Annual	29 007	22 410	6 354	795	715	1 241
	I	3 524	2 519	970	835	746	1 148
	II	7 066	5 758	1 235	758	684	1 355
	III	11 055	8 637	2 333	716	656	1 025
	IV	7 361	5 497	1 817	984	860	1 667
2013	Annual	32 309	25 322	6 760	824	749	1 252
	I	4 649	3 270	1 344	974	851	1 442
	II	8 316	6 929	1 329	810	747	1 335
	III	11 579	9 152	2 344	721	667	1 001
	IV	7 765	5 972	1 744	956	854	1 542
2014	Annual	34 306	27 778	6 289	828	775	1 130
	I	4 808	3 632	1 138	949	877	1 230
	II	8 976	7 534	1 379	818	759	1 325
	III	12 854	10 439	2 329	752	712	963
	IV	7 668	6 172	1 444	924	867	1 224
2015	Annual	31 465	25 439	5 843	756	715	970
	I	4 869	3 815	1 024	911	884	994
	II	7 734	6 663	1 026	719	691	921
	III	12 294	9 894	2 334	706	670	881
	IV	6 568	5 067	1 459	810	737	1 183
2016	Annual	22 107	15 991	5 965	705	633	978
	I	4 066	2 880	1 158	796	717	1 059
	II	4 981	3 809	1 133	665	602	973
	III	8 277	5 888	2 340	686	622	901

Year	Tourism Income				Average tourism expenditure per capita		
	Period	Total (million $)	Foreigner (million $)	Citizen (resident abroad) (million $)	Total ($)	Foreigner ($)	Citizen (resident abroad) ($)
	IV	4 783	3 414	1 335	714	626	1 072
2017	Annual	26 284	20 223	5 909	681	630	903
	I	3 370	2 405	944	696	637	880
	II	5 413	4 376	1 004	611	570	845
	III	11 392	8 728	2 605	684	634	900
	IV	6 109	4 715	1 356	741	687	978
2018	Annual	29 513	24 028	5 346	647	617	801
	I	4 425	3 348	1 054	723	682	869
	II	7 045	5 936	1 073	636	602	885
	III	11 503	9 372	2 086	612	589	724
	IV	6 540	5 372	1 133	678	649	828
2019	Annual	34 520	28 705	5 688	666	642	796
	I	4 630	3 704	906	697	678	765
	II	7 974	6 975	967	625	607	766
	III	14 031	11 485	2 505	649	623	789
	IV	7 885	6 542	1 311	727	702	859
2020	Annual	12 059	9 097	2 887	762	716	926
	I	4 101	3 292	791	727	710	788
	II	-	-	-	-	-	-
	III	4 044	2 875	1 138	722	649	969
	IV	3 914	2 930	958	854	804	1 019
2021	Annual	24 482	18 790	5 577	834	785	1 029
	I	2 452	1 677	762	943	918	983
	II	3 004	2 183	802	739	694	871
	III	11 395	8 851	2 501	835	773	1 146
	IV	7 631	6 079	1 512	843	809	982

3. LITERATURE REVIEW

The relationship between real exchange rate and tourism income is explained by the fact that tourism contributes to growth through foreign exchange returns and employment opportunities. In terms of countries, the exchange rate level plays an active role in increasing tourism income. The exchange rate level affects the sector stakeholders according to the foreign exchange input-output structure of each company. If an enterprise uses imported inputs or if its income is derived from the local currency while its prices are determined according to the exchange rate, a decrease in the exchange rate will be in favor of that enterprise. Because the depreciation of the foreign currency against the local currency will reduce the costs on the basis of the local currency. Whereas businesses with costs in local currency and income in foreign currency will be adversely affected by the decrease in the exchange rate. Since the sales revenues of these businesses are derived in foreign currency, the depreciation of the foreign currency will also reduce the revenues in local currency terms and cause the profit margins of the businesses to decrease. Finally, there will be changes in travel trends as the depreciation of the tourists' own national currency against the national currency of the country they will travel to will reduce the purchasing power of the tourists (Demir, 2021).

The literature on the relationship between real exchange rate and tourism income includes studies also on the tourism income of Turkey. One of them is the study by Kaya and Cömlekçi (2013). They found a negative relationship between tourism income and exchange rate volatility in their study, in which the data between 2002 and 2011 were used and the multiple linear regression method was applied.

Samırkaş and Samırkaş (2014) conducted a Granger causality analysis with the data belong to the 2003-2013 period, and determined a bidirectional relationship between tourism income and economic growth in Turkey.

Şen and Sit (2015) applied the Toda-Yamamoto causality analysis in their studies by using the data of the 2000-2012 period. According to the results of the analysis, it was observed that the real exchange rate and tourism income mutually affect each other.

Selim, Güven, and Eryiğit (2015) used VAR and the block Granger causality analysis method in their studies for the data between 1980 and 2012. According to the results, a unidirectional causality from economic growth to tourism income and real effective exchange rate was observed.

Öncel, İnal, and Torusdağ (2016) conducted a Toda-Yamamoto causality analysis with the data from the 2003-2015 period, and determined a unidirectional causality relationship from tourism income to real exchange rate in Turkey.

Dilber and Kılıç (2018) conducted a VAR analysis in their study using the data between 1995-2016. According to the results, it has been determined that there is a long-term relationship between tourism income and economic growth in Turkey.

The study by Dereli and Akiş (2019) that used the data between 1970 and 2016 and conducted (Toda & Yamamoto, 1995) causality analysis, found a unidirectional causality from tourism income to economic growth in Turkey.

Pekmezci (2020) determined that there is a one-way relationship between the number of foreign tourists visiting Turkey and economic growth in his study, using the data between 1998 and 2019 and applying Toda-Yamamoto causality analysis.

In the study by Arslan and Cetiner (2020) the relationship between exchange rates and tourism income was examined using 2008-2019 period data for Turkey. It has been concluded that there is a relationship between exchange rates and tourism income. However, they can explain each other at low percentages, that is, they are also affected by other variables. A rise in the exchange rate increases tourism income initially, and then loses its effect as a result of cyclical fluctuations. Likewise, an increase in tourism income decreases the exchange rate initially and then loses its effect.

Sevim and Oğan (2020) conducted a Granger causality analysis with the data from the 2012-2018 period, and determined that there is no causality relationship between the real exchange rate and tourism income in Turkey.

Demir (2021) investigated the relationships between exchange rate, tourism income and economic growth using quarterly data between 2003Q1-2020Q1. Zivot and Andrews structural break unit root test, Johansen cointegration analysis, FMOLS and DOLS methods, Toda-Yamamoto test and causality analysis were performed in the study. According to the results of the analysis, a long-term relationship was determined between the variables. Furthermore, the effect of real exchange rate on national income was found to be higher than the effect of real exchange rate on tourism income.

Timur and Mert (2021) used non-linear ARDL analysis method in their study, which includes the data between 2003-2020. As a result of the study, an asymmetrical relationship in the long run and a symmetrical one in the short run were determined between the exchange rate and tourism income in Turkey.

In the study by Akar and Özcan (2021) the relationship between the real exchange rate and tourism income in Turkey was examined. The data set of the study includes monthly data belong to the period of 2012-2019. The structural VAR model and the Generalized Least Squares estimation method were used in the study. According to the findings obtained, it was concluded that the reactions that the variables gave to each other were negligable for the specified period.

Demir and Bahar (2021) examined the effect of tourism income on economic growth in their study by using the Engle-Granger co-integration method, and found that tourism income had positive effects on Turkey's economic growth parameters for the 2003Q1-2018Q4 period.

4. METHODOLOGY

The main question of the study is: "does the real effective USD/TRY exchange rate have an impact on tourism income?". In addition to this question, the secondary question is: "does the real effective USD/TRY exchange rate have an impact on average tourism expenditure per capita?". To answer these two questions, quarterly data consisting of 68 observations for the period 2003Q1-2019Q4 were used in the econometric model in which tourism income and per capita tourism expenditure variables were dependent variables and USD/TRY exchange rate was the independent variable.

With the announcement of the Covid-19 pandemic in March 2020, countries closed their borders and tourism income decreased by 65% compared to the year 2019, regardless of the exchange rate movements. Therefore, the years 2020 and 2021 were not included in the econometric analysis of the study.

The data set was obtained from the websites of the Turkish Statistical Institute and the Central Bank of the Republic of Turkey. The abbreviations and variable names of the data used in the analyzes are presented in Table 2.

Table 2. Variables.

Variables in the Model	
Income	Tourism Income
Percapita	Average Tourism Expenditure Per Capita
USD/TRY	CPI Based Real Effective USD/TRY Exchange Rate (2003=100)

A correlation between two variables, even if it is a high correlation, does not provide sufficient information about the cause-effect relationship between the variables. The Granger causality test investigates how effective the lagged values of two different variables (x and y) are in explaining the other variable. The Granger causality test reveals whether either variable x or y leads to the other (Granger, 1969) and is one of the most frequently used methods in empirical analysis. Granger causality originated from the idea that the cause of the past cannot be the future or the present, and that if an event occurs before another event, the event that occurred first could be the cause of the event that occurred later. Although the Granger causality test is quite applicable, it has some shortcomings. First of all, the variables to be tested for Granger causality must be stationary (Granger, 1988). In other words, to apply the Granger (1988) method, the non-stationary series must be integrated of the same order and there must be a cointegration relationship between the series. Hence, a unit root test should be applied to determine the stationary propeties of the variables (Öner & Satıcı, 2020).

Therefore, as the first step of econometric analysis, it will be investigated whether the series are stationary or not by applying the Augmented Dickey-Fuller (ADF) unit root test. If the variance and mean of a time series do not change over time and the common variance between two periods does not depend on this common period, but only on the distance between the two periods, this time series has a stationary structure (Gujarati, 1999). Series that are not stationary are called "series with unit roots". If it is determined as a result of the ADF unit root test that the series is not stationary at the level value, the difference of the series will need to be taken (Içellioğlu & Oztürk, 2018).

ADF unit root testing is performed using these three models:

None Model : $\Delta Y_t = (\rho - 1)Y_{t-1} + u_t$ (1)

Constant Model: $\Delta Y_t = \delta Y_{t-1} + u_t$ (2)

Trend & Constant Model: $\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta Y_{t-i} + \varepsilon_t$ (3)

The *t* statistical values obtained as a result of Equation 1, Equation 2 and Equation 3 can be compared with the 1%, 5% or 10% Mackinnon critical values. In this study, the 5% Mackinnon critical value, which is the most widely used critical value by the researchers, were used.

Analysis results were tested against null and alternative hypothesis in terms of the stationarity test. According to the *t* statistical values obtained as a result of the ADF unit root test, either the null hypothesis (H_0) or the alternative hypothesis (H_1) is accepted. The definitions of the H_0 and H_1 hypothesis are as follows:

H_0: If $\delta = 0$, Y_t is non-stationary, it has a unit root. (4)

H_1: If $\delta < 0$, Y_t is stationary and has no unit root. (5)

Equation 4 presents that Y_t is non-stationary, while Equation 5 presents that Y_t is stationary. If the series are not stationary, the lag length of the variables need to be determined. For this purpose, lag lengths that minimize Akaike, Hannan-Quinn and Schwartz information criteria were determined. After the appropriate lag length was found, the Granger causality test was applied. Granger causality test, which is one of the most widely used tests by researchers because it is easy to use and interpret, is analyzed through these two equations (Öner., 2018):

$$y_{1t} = \alpha_{10} + \beta_{11} y_{1t-1} + \beta_{12} y_{2t-1} + \gamma_{11} y_{1t-2} + \gamma_{12} y_{2t-2} + \delta_{11} y_{1t-3} + \delta_{12} y_{2t-3} + u_{1t} \quad (6)$$

$$y_{2t} = \alpha_{20} + \beta_{21} y_{1t-1} + \beta_{22} y_{2t-1} + \gamma_{21} y_{1t-2} + \gamma_{22} y_{2t-2} + \delta_{21} y_{1t-3} + \delta_{22} y_{2t-3} + u_{2t} \quad (7)$$

According to the results of Granger causality analysis, if the coefficients in Equation 6 are different from zero at a certain significance level, it is concluded that y_1 is the cause of y_2; while if the coefficients in Equation 7 are found to be different from zero at a certain significance level, it is concluded that y_2 is the cause of y_1 (Granger, 1969). These causality results are expressed as Granger causality from y_1 to y_2 and from y_2 to y_1 (Brooks, 2002).

The following two hypotheses were established for the probability values obtained from the Granger causality test analysis results:

H_0: Changes in y_1 are not the cause of changes in y_2 (8)

H_1: Changes in y_1 are the cause of changes in y_2 (9)

Equation 8 presents that changes in y_1 are not the cause of changes in y_2; while Equation 9 presents that Changes in y_1 are the cause of changes in y_2. As a result of the Granger causality test, if the probability value is below 0.05, the H_1 hypothesis is accepted so that the H_0 hypothesis is rejected. Acceptance of the alternative hypothesis is called the Granger cause of the variable y_2 of y_1 (Öner, 2018). After evaluating the results of the Granger causality test, variance decomposition analysis was carried out and impulse-response functions. figures were created to determine the shocks between the variables.

The variance decomposition method is a method that investigates what percentage of the variation in the variance of each of the examined variables is explained by their own lags and what percentage is explained by other variables, in a certain time period. It can also be used as a side evaluation of whether the variables are internal or external. On the other hand, impulse-response analysis investigates the effect of a random shock in one of the variables on other variables in the system and in this respect plays an important role in shaping economic policies. To determine how the shocks will occur, the movements of the variables within 10 periods were examined first. The reactions of the other series against the 1-unit shock change in the series are illustrated with the help of graphics (Akyüz, 2018; Tarı, 2010).

5. EMPIRICAL ANALYSIS AND FINDINGS

As stated before, quarterly data consisting of 68 observations for the period 2003Q1-2019Q4 were used in the econometric model in which tourism income and per capita tourism expenditure variables of Turkey were dependent variables and USD/TRY exchange rate is the independent variable. It will be useful to examine the statistical results of the variables before moving on to the econometric analysis part of the study.

Table 3. Descriptive statistics.

Statistics	USD/TRY	INCOME (000 $)	PERCAPITA
Minimum	62.740	1,261,787	610.719
Maximum	127.710	14,031,122	983.605
Mean	103.578	6,379,813	776.357
Median	105.135	5,776,933	756.292
Std. Dev.	13.812	3,108,422	95.888
Skewness	-0.810	0.544	0.473
Kurtosis	3.379	2.394	2.487
Jarque-Bera	7.850	4.401	3.285
Probability	0.019	0.110	0.193
Observations	68	68	68

According to the 68 observations in Table 3, the mean value of real USD/TRY is 103.57, while the smallest value is 62.74 and the largest value is 127.710. Apart from that, the mean value of tourism income is 6,379,813,000 US Dollars, and mean values of average tourism expenditure per capita is 776.357 US Dollars.

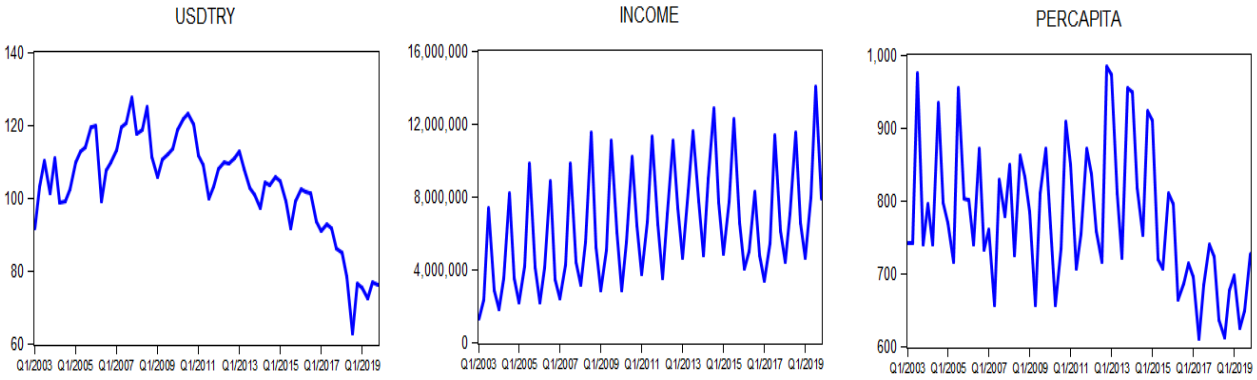

Figure 1. Graphical representation of Variables: 2003Q1-2019Q4.

Figure 1 consists of the figures of the time series of 68 quarterly observations for the period 2003Q1-2019Q4, and shows that the series can have a certain constant and trend. In the analyses, including non-stationary time series, the problem of spurious regression may be encountered and this may lead to misleading results. Therefore, before the causality analysis, the stationarities of the variables were analyzed with the ADF unit root test. The ADF unit root test results of USD/TRY, INCOME and PER CAPITA variables are given in Table 4.

Table 4. ADF unit root test results of variables.

Variables		Intercept		Trend & Intercept	
USD/TRY	Level	-1.525	0.515	-3.254	0.083
	1.st Difference	-9.419	0.000	-9.508	0.000
Income	Level	-1.762	0.395	-2.760	0.217
	1.st Difference	-3.474	0.011	-3.427	0.046
Per Capita	Level	-1.357	0.597	-1.731	0.725
	1.st Difference	-4.523	0.001	-4.464	0.003

As seen in Table 4, the level values of USD/TRY, INCOME and PER CAPITA variables have unit root and the first difference values of all three variables are stationary.

The results of VAR lag order selection criteria are given in Table 5. As seen, according to the most widely used criterions such as AIC, SC and HQ, the lag length was specified as 5.

Table 5. VAR lag order selection criterias.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1575.137	NA	1.41e+19	52.604	52.709	52.645
1	-1505.697	129.621	1.88e+18	50.589	51.008	50.753
2	-1474.468	55.169	8.98e+17	49.848	50.581	50.135
3	-1462.048	20.699	8.06e+17	49.734	50.782	50.144
4	-1394.589	105.685	1.16e+17	47.786	49.147	48.318
5	-1373.133	31.469	7.81e+16	47.371	49.046	48.026
6	-1366.855	8.580	8.80e+16	47.461	49.451	48.240

Finally, it is essential to determine whether the predicted model satisfies the stationarity condition. The stationarity of the VAR model depends on the eigen values of the coefficient matrix. The system is considered stable if the eigen values of the coefficient matrix are inside the unit circle, and unstable if at least one of the eigen values is above or outside the unit circle.

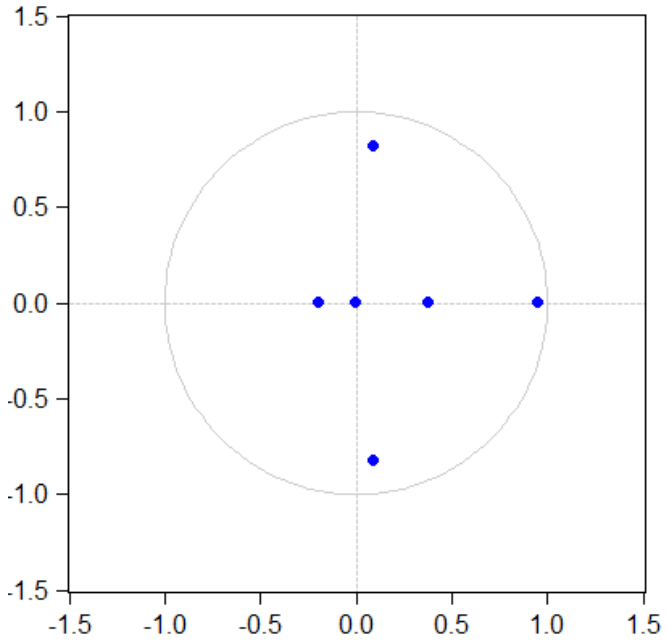

Figure 2. Inverse roots of AR charasteristic polynomial.

According to Figure 2, the position of the inverse roots of the AR characteristic polynomial of the predicted model within the unit circle illustrates that the model does not have any problems in terms of stationarity.

Table 6. VAR granger causality/block exogeneity wald test results.

Dependent variable: USD/TRY			
Excluded	Chi-sq	df	Prob.
INCOME	6.807	5	0.235
PER CAPITA	13.038	5	0.023
Dependent variable: INCOME			
Excluded	Chi-sq	df	Prob.
USD/TRY	1.646	5	0.895
PER CAPITA	2.225	5	0.817
Dependent variable: PERCAPITA			
Excluded	Chi-sq	df	Prob.
USD/TRY	11.855	5	0.049
INCOME	8.865	5	0.114

VAR Granger causality/block exogeneity Wald test results are given in Table 6. According to the results, Granger causality is determined from the real effective USD/TRY exchange rate to the average tourism expenditure per capita, and also from the average tourism expenditure per capita to the real effective USD/TRY exchange rate. In other words, a bilateral causality relationship was determined between the real effective USD/TRY exchange rate and the average tourism expenditure per capita. However, Granger causality could not be determined between the real effective USD/TRY exchange rate, which is the main subject of the study, and tourism income. Summarized results of Granger causality test are given in Table 7.

Table 7. Summarized results of granger causality test.

Independent variable	Granger direction	Dependent variable	Results
USD/TRY	↔ ↔	Per Capita Income	Bilateral Causality No Causality

Table 8. Variance decomposition analysis results.

Income				
Period	**S.E.**	**USD/TRY**	**Income**	**Per Capita**
1	899214	0.071	99.928	0.000
2	1062772	1.161	98.554	0.284
3	1094033	1.182	98.354	0.463
4	1097488	1.258	98.263	0.478
5	1374933	0.802	98.707	0.489
6	1439002	0.757	98.754	0.487
7	1443461	1.166	98.337	0.496
8	1454821	1.614	97.379	1.006
9	1587991	1.662	96.770	1.567
10	1610871	1.695	96.360	1.943
Percapita				
Period	S.E.	USD/TRY	Income	Per Capita
1	43.770	0.0127	28.588	71.399
2	52.391	7.4759	35.047	57.476
3	56.834	15.256	35.641	49.101
4	58.145	18.550	34.342	47.107
5	65.561	16.047	32.657	51.295
6	68.774	16.856	34.346	48.796
7	70.452	18.445	34.830	46.724
8	71.130	19.824	34.242	45.933
9	74.085	19.123	32.312	48.564
10	76.021	20.239	32.348	47.411

According to the results of the variance decomposition analysis, which reveal how much the dependent variable is affected by the shocks of the independent variables, the dependent variable INCOME is affected by its own shocks 99.92% on the first day, and over 96% on the following days. In addition, the INCOME variable is affected by the shocks of the USD/TRY variable by 1.16% and 1.18% on the second and third days, respectively, and by 1.69% on the tenth day.

As seen in Table 8, the dependent variable PER CAPITA is highly explained by other variables. It is affected by its own shocks 71.39% on the first day, and by 47.41% on the tenth day. In addition, the PER CAPITA variable is affected by the shocks of the USD/TRY variable by 7.47% and 15.25% on the second and third days, respectively, and by 20.23% on the tenth day. It is also affected by the shocks of the INCOME variable by 28.58% and 35.04% on the first and second days, respectively, and by 32.34% on the tenth day. According to these results, the ratio of the average tourism expenditure per capita in Turkey to be explained by tourism income and real exchange rate is quite high.

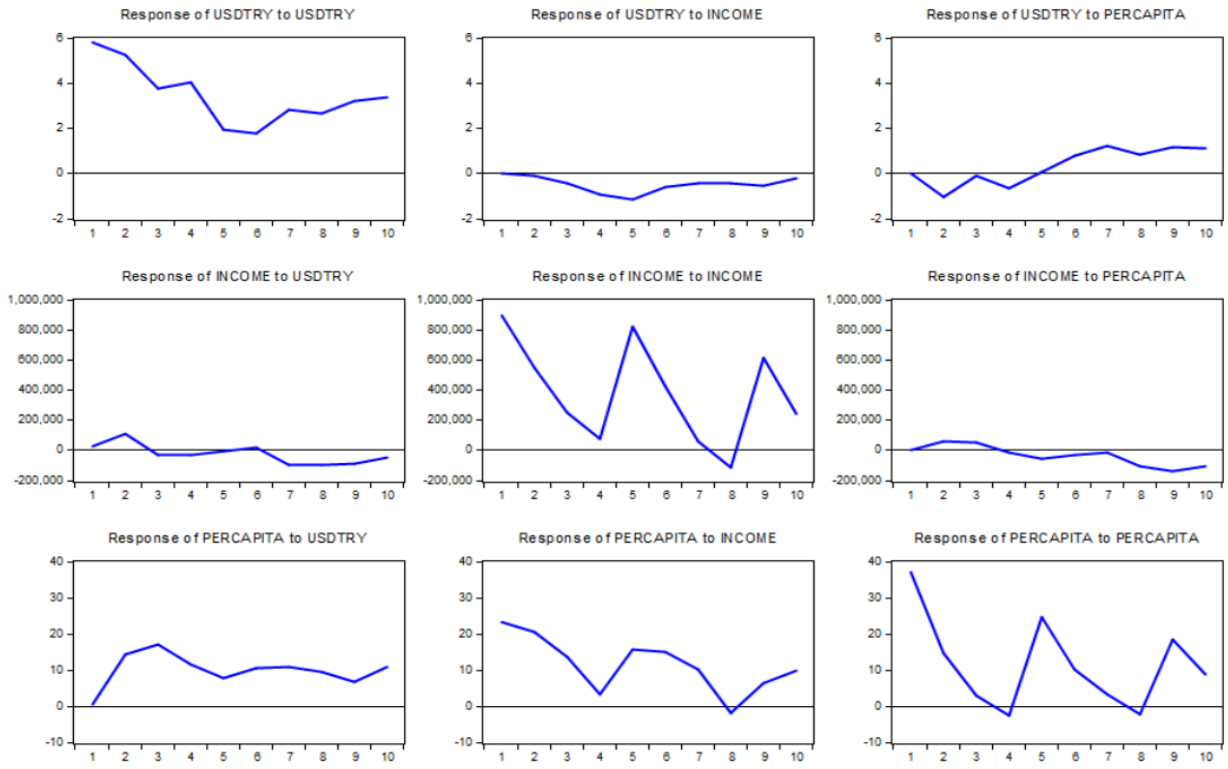

Figure 3. Impulse-response functions.

Impulse-Response functions figures, which are the last stage of the analysis, are given in Figure 3. Accordingly, the effect of the real USD/TRY exchange rate on tourism income is observed to be positive between the 1st and 3rd quarters, negative after the 3rd quarter, zero in the 6th quarter and negative again after the 6th quarter. On the other hand, the effect of the real USD/TRY exchange rate on average tourism expenditure per capita is observed to be zero in the 1st quarter, and positive in all subsequent quarters.

6. CONCLUSION

The tourism sector is one of the fastest growing industries in the world today. The said growth rate has been beyond expectations due to the rapid change in information and transportation technologies. Tourism, which has become very important economically and socially since the second half of the Twentieth Century, constitutes a potential source of income for the economies of developing countries.

The rapid growth trend observed in the tourism sector in the world has also shown itself in Turkey. Tourism, which is a labor-intensive sector, provides an important foreign currency inflow for Turkey, which has a young population. In addition, tourism is very important for the country's economy in terms of increasing production diversity and international relations. From this point of view, this study examined the effect of the real effective USD/TRY exchange rate on tourism income and average tourism expenditure per capita. For this purpose, first of all, the relationship between real effective USD/TRY exchange rate, tourism income and average tourism expenditure per capita was analyzed with the Granger causality test. According to the Granger causality test results, a bilateral causality relationship was determined between the real effective USD/TRY exchange rate and the average tourism expenditure per capita. However, a Granger causality relationship could not be determined between the real effective USD/TRY exchange rate and tourism income.

To support the results obtained from the Granger causality test, variance decomposition analysis was carried out and impulse-response functions figures were created to determine the shocks between the variables. According to the results of the variance decomposition analysis, the ratio of the average tourism expenditure per capita in Turkey to be explained by tourism income and real effective exchange rate is quite high. Therefore, policy

practitioners in Turkey should consider the level of exchange rates in the policy-making process for the development of the tourism sector, and also implement policies that reduce exchange rate volatility.

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