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.

| Year | 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       | 796            | 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       | 798            | 1 217                          |
|      | IV     | 3 463             | 2 514                 | 903                                   | 732       | 641            | 1 117                          |
| Year | Period | Total Income (million $) | Foreigner (million $) | Average tourism expenditure per capita |
|------|--------|--------------------------|----------------------|---------------------------------------|
| 2007 | Annual | 20,943 | 15,936 | 1,212 |
|      | I     | 2,425 | 1,683 | 692 |
|      | II    | 4,263 | 3,555 | 657 |
|      | III   | 9,845 | 7,385 | 743 |
|      | IV    | 4,410 | 3,333 | 702 |
| 2008 | Annual | 25,415 | 19,612 | 1,191 |
|      | I     | 3,162 | 2,292 | 742 |
|      | II    | 5,290 | 4,635 | 679 |
|      | III   | 11,506 | 8,731 | 774 |
|      | IV    | 5,227 | 3,955 | 745 |
| 2009 | Annual | 25,065 | 19,064 | 1,222 |
|      | I     | 2,851 | 2,086 | 709 |
|      | II    | 5,076 | 4,209 | 603 |
|      | III   | 11,103 | 8,359 | 722 |
|      | IV    | 6,034 | 4,409 | 753 |
| 2010 | Annual | 24,931 | 19,110 | 1,231 |
|      | I     | 2,865 | 2,097 | 670 |
|      | II    | 5,499 | 4,495 | 588 |
|      | III   | 10,174 | 7,821 | 666 |
|      | IV    | 6,393 | 4,698 | 780 |
| 2011 | Annual | 28,116 | 22,222 | 1,168 |
|      | I     | 3,737 | 2,751 | 709 |
|      | II    | 6,600 | 5,579 | 656 |
|      | III   | 11,314 | 9,896 | 702 |
|      | IV    | 6,465 | 4,897 | 780 |
| 2012 | Annual | 29,007 | 22,410 | 1,488 |
|      | I     | 3,524 | 2,519 | 746 |
|      | II    | 7,066 | 5,758 | 684 |
|      | III   | 11,055 | 8,637 | 656 |
|      | IV    | 7,361 | 5,497 | 800 |
| 2013 | Annual | 32,309 | 25,922 | 1,252 |
|      | I     | 4,649 | 3,270 | 749 |
|      | II    | 8,316 | 6,929 | 747 |
|      | III   | 11,579 | 9,152 | 667 |
|      | IV    | 7,765 | 5,972 | 804 |
| 2014 | Annual | 34,306 | 27,778 | 1,335 |
|      | I     | 4,808 | 3,632 | 777 |
|      | II    | 8,976 | 7,534 | 759 |
|      | III   | 12,854 | 10,439 | 712 |
|      | IV    | 7,668 | 6,172 | 867 |
| 2015 | Annual | 31,465 | 25,439 | 1,224 |
|      | I     | 4,869 | 3,815 | 884 |
|      | II    | 7,734 | 6,663 | 691 |
|      | III   | 12,294 | 9,894 | 670 |
|      | IV    | 6,568 | 5,067 | 737 |
| 2016 | Annual | 22,107 | 15,991 | 1,978 |
|      | I     | 4,066 | 2,880 | 633 |
|      | II    | 4,981 | 3,809 | 602 |
|      | III   | 8,277 | 5,888 | 622 |
| Year | Period | Total (million $) | Foreigner (million $) | Citizen (resident abroad) (million $) | Total ($) | Foreigner ($) | Citizen (resident abroad) ($) |
|------|--------|-------------------|-----------------------|---------------------------------------|-----------|--------------|-------------------------------|
| 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            | 3 848                 | 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                 | 1 341                                 | 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 Cömlekçı (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.
Samurkaş and Samurkaş (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 Akış (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 negligible 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.

| 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 properties 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 (İçelioğlu & 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: \( \Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta Y_{t-i} + \epsilon_t \)  (3)
The 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.

Table 4. ADF unit root test results of variables.

| Variables         | Intercept | Trend & Intercept |
|-------------------|-----------|-------------------|
| USD/TRY           |           |                   |
| Level             | -1.525    | 0.515             |
| 1st Difference    | -9.419    | 0.000             |
| Income            |           |                   |
| Level             | -1.762    | 0.395             |
| 1st Difference    | -3.474    | 0.011             |
| Per Capita        |           |                   |
| Level             | -1.357    | 0.597             |
| 1st Difference    | -4.528    | 0.001             |

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.

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.

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

Table 7. Summarized results of Granger causality test.

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   | 98.554 | 0.463      |
|        | 4      | 1097488 | 1.258   | 98.263 | 0.478      |
|        | 5      | 1374033 | 0.802   | 98.707 | 0.489      |
|        | 6      | 1439002 | 0.757   | 98.754 | 0.487      |
|        | 7      | 1444461 | 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  | 34.850 | 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.
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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