IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume: XII, Issue: 2, Year: 2022, pp. 526-541

The Non-Linear Effect of Relative Real Foreign Exchange Rates on International Tourism Demand in Turkey: A Panel Threshold Modeling Approach

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Received: 19.07.2021, Accepted: 27.09.2022
DOI Number: 10.5281/zenodo.7512133

Abstract

This paper aims to investigate (i) whether there is a certain threshold level that changes the effect of the relative real effective exchange rate on demand for tourism and, (ii) whether the volatility of the relative real effective exchange rate has an impact on demand for international tourism considering the non-linear relationship between the ratio of Turkey's real effective exchange rate to the real effective exchange rates of 29 OECD countries and the demand for international tourism in Turkey. Empirical results suggest that the real effective exchange rate has a threshold on demand for international tourism. Further, the relative real effective exchange rate volatility generating uncertainty has a significant and negative effect on demand for international tourism.

Keywords: Dynamic Panel Threshold Model, International Tourism Demand, Exchange Rate Volatility, Uncertainty, Turkey

JEL Code: Z32, D51, C23

1.Introduction

Tourism industry is a rapidly growing industry worldwide, with the number of tourists reaching 1.4 billion people in 2018 (UNWTO, 2019). Tourism industry has also contributed $2,750 billion to the global GDP in 2018, accounting for 3.2% of the total global GDP. In 2018, 122 million people were in employment within the tourism industry, accounting for 3.8% of total employment (World Travel and Tourism Council, 2019). The tourism industry in Turkey is rapidly growing and as well contributes to revenues

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and employment significantly. The number of tourists visited Turkey reached 45 million people in 2018, with a significant increase from 9 million and 33 million people in 2000 and 2010, respectively (The World Bank, 2019; TurkStat, 2019). In that period, the amount of revenue from tourism accruing to Turkey has increased from $7 billion to $36 billion, representing a share of 16.6% of the total amount of exports for Turkey (The World Bank 2019; World Travel and Tourism Council, 2019). The tourism sector has a crucial contribution to Turkey's total GDP and employment with 12.1% and 7.7% (with 2.2 million people employed in the tourism industry), respectively (World Travel and Tourism Council, 2019). Consequently, the tourism industry is widely adopted as a crucial foreign exchange resource contributing to revenues and employment levels (Jeřábek, 2019; Iordache et al., 2010). The number of tourists with OECD country of origin into Turkey considered in this study is equivalent to 34% of the total number of tourists visiting Turkey.

Since tourism emerges as a crucial determinant, especially for emerging economies, any attempt that concentrates on exploring potential factors affecting demand for tourism gives valuable information for future policy directions in the tourism industry. The existing literature on tourism demand highlights that GDP per capita for a country and foreign exchange rates are two of the most important determinants of demand for tourism, while the impact of the latter determinant (in real terms) was assumed as linear. However, when demand for tourism and foreign exchange rates are simultaneously considered, a potentially small amount of change on real foreign exchange rates may have a negligible impact on demand for tourism, whereas a large amount of change in real foreign exchange rates may have a significant impact on demand for tourism. In such a circumstance, a threshold value of real foreign exchange rates is necessitated to discuss the significant impact of foreign exchange rates on demand for tourism. The present paper considers a threshold value for real foreign exchange rates and the impact of real foreign exchange rates is measured if the change on foreign exchange rates exceeds the underlying threshold value. The present paper also purposes to fill this void in the existing literature by concentrating on the impact of volatility of relative foreign exchange rates on demand for tourism, where as far as is known, only limited number of studies have concentrated on this issue. When tourism service is principally considered a normal good, the volatility of foreign exchange rates is expected to have an impact on demand for tourism by increasing the uncertainty in prices.

The present paper aims to contribute to the existing literature by investigating whether real foreign exchange rates have a threshold level on tourism demand for Turkey. As existing literature focusing on the effect of exchange rate volatility on demand for tourism is limited, this paper also investigates the impact of the real effective exchange rate volatility. The result of the study highlights that the real effective exchange rate has a threshold level and that the real effective exchange rate volatility has a negative impact on tourism demand for Turkey.

2. Literature review

In terms of variable selection, the number of tourists was frequently used as a referent variable of demand for tourism in the existing literature. At the same time, tourist expenditures and the number of nights stayed may also be considered as other proxy variables of demand for tourism (Witt and Witt, 1995). Due to the easiness of access to the number of tourists, many earlier studies have considered the number of tourists to refer to demand for tourism (Gallet and Braun, 2001; Li et al., 2005). On the other hand, demand for tourism can be defined mainly as a function of income, price, exchange rate, and individual habits representing the lagged values of the dependent variable (Dogru et al., 2017). In the demand function for tourism, income is usually represented by the GDP per capita of the country of origin (Agiomirgianakis et al., 2018; Chaisumpunsakul & Pholphirul, 2018; Kumar et al., 2020; Martins et al., 2017; Pham et al., 2017; Qiong & Chen, 2018; Vogt, 2008; Vogt & Wittayakorn, 1998). However, in some studies, the Industrial Production Index (IPI) was used to represent income since monthly GDP per capita values could not be obtained. In a study by González & Moral (1995), the industrial production index of that country was used to represent the income of the country of tourist origin. Studies that examine the demand for tourism in Hong Kong (Goh, 2012), studies conducted with data on Korea (Seo et al., 2009), and examining demand for tourism in Porto (Álvarez-Díaz et al., 2019) also used IPI as a proxy for income. Comparing GDP per capita and IPI in demand for tourism, (Dogru et al., 2017) found GDP per capita to be statistically significant on tourism demand, while the industrial production index was statistically insignificant. In fact, the authors stated that this situation might be due to the fact that the industrial production index represents economic growth based only on industry and ignores economic growth based on the service sector. For this reason, it can be said that the GDP per capita variable as a determinant of demand for tourism is more appropriate than the Industrial Production Index data.

Another important factor determining the demand for tourism is price. The decrease in prices in the destination intended for tourism will positively affect the demand for tourism in this destination. However, since the price decrease is not very likely, it can be said that the demand for tourism is high for the destinations with a relatively low increase in price. In order to examine the effect of price on the demand for tourism, the Consumer Price Index (CPI) of the destination country can be used by proportioning it to the CPI of the tourist country of origin. Besides, the CPI of the destination country can be compared to the CPI of another rival destination. Studies analyzing demand for tourism in Spain (González & Moral, 1995); demand for tourism in Hong-Kong (Goh, 2012; Xu et al., 2016); and studies using data on Belgium (Santos & Cincera, 2018), as documented in the literature, used relative prices to examine the effect of price on demand for tourism function. However, it would be incomplete to examine the effect of price on tourism demand regardless of exchange rates (Dogru et al., 2017). Even if the relative prices of the two countries are at the same level, the differences in exchange rates can make country prices more competitive. It can even be stated that individuals are more interested in exchange rates than the price level in holiday destinations (Martin & Witt, 1988). When studies analyzing demand for tourism are examined, it is seen that some of them use nominal exchange rates to examine the price effect (Sireeranhan et al., 2017; Uysal &

Crompton, 1984). However, the effect of inflation cannot be tracked when the nominal exchange rate is used. Since the real exchange rate is obtained by weighting the nominal exchange rate with the CPI, this variable can be conceived as a better representer of price. Thus, both inflation and the exchange rate effect will be analyzed using this variable. Most studies in the current literature on demand for tourism use the real exchange rate in analyzing the price effect (Ibrahim, 2011; Khoshnevis Yazdi & Khanalizadeh, 2017; C. Lim & Zhu, 2017; J. Lim & Won, 2020; Nouri & Soltani, 2017; Puah, Huan, & Thien, 2018; Qiong & Chen, 2018).

Due to the effect of the real exchange rate on demand for tourism, some studies have recently started to analyze the effect of exchange rate volatility on demand for tourism. (Sharma and Pal, 2020) concluded that the volatility in the real exchange rate negatively affects the demand for tourism in India. The study also found that the long-run effect of fluctuations in the real exchange rate is greater than the short-run effect. (Chi, 2020) concluded that real exchange rate volatility has an impact on Korean citizens' demand for tourism in Japan, the Philippines, Singapore, Taiwan, and the US.

Different factors have been tried to be examined besides income and price effects in demand for tourism function. Remoteness, corruption, terrorism, foreign trade, being a border neighbor, speaking the same language, and having the same religion are some of them. It can be said that among these effects other than income and price, the distance effect is examined the most. Research findings from these studies show that determined that distance has a negative effect on demand for tourism. In studies based on data on Brazil (Tavares & Leitao, 2017) and based on data on Indonesia (Muryani et al., 2020), it was concluded that distance has a negative effect on demand for tourism. Based on the arrival-departure data analyzed in McKercher and Mak's (2019) study, it was determined that 53% of visits were made to neighboring countries, and only 3% of the trips were made to a destination of more than 5,000 km. Another variable examined in tourism demand is terrorism. Using data on Turkey between 2006-2017, Karamelikli et al. (2020) demonstrated that terrorism has a negative and downside on demand for tourism. Using the data on Turkey, Israel and Lebanon, Bassil et al. (2019) concluded that terrorism has an adverse effect on demand for tourism. Demir and Gozgor (2017) used data on Turkey and examined the effects of corruption on demand for tourism and found that corruption affects demand for tourism negatively. Mitra (2019) examined the causal relationship between tourism and economic growth for 158 countries and reported a bivariate causal relationship. The bivariate causality remains consistent across three sub-samples when tourism growth is measured based on international tourism receipt.

Just as different variables are used in analyzing demand for tourism besides income and price variables, many different methods are used as well. In some studies, methods based on time series with data from a single country were used. In addition, it can be said that there are studies using the data covering countries of origin of most tourists and panel data analysis. In a relatively limited study conducted recently, the

asymmetric relationship of price and income variables on demand for tourism has been examined. In a study, Husein and Kara (2020) claimed that there is no symmetrical relationship between income of the tourist's country and demand for tourism; the asymmetric effect of income on tourism demand from the USA to Puerto Rico has been examined. At the end of the study, it was determined that a 1% increase in the US GDP per capita increased the demand for tourism in Puerto Rico by 1.9%, while a 1% decrease in the US GDP per capita decreased the demand for tourism in Puerto Rico by 4.8%. This situation was interpreted as an asymmetrical relationship between income and demand for tourism. In a similar vein, Brida et al. (2016) investigated whether the relationship between tourism and economic growth for Brazil and Argentina. The results provide evidence in favor of the nonlinearity only in the case of Brazil. Using data from ten European countries, Irandoust (2019) determined that the real exchange rate has an asymmetrical relationship with demand for tourism.

Considering the literature on demand for tourism, it is seen that income and price effects are generally examined, and some parameters such as distance, foreign trade, being a neighbor, and terrorism are also used in the analyzes in different studies. A limited number of studies analyze whether volatility in the real exchange rate, which represents price, affects demand for tourism negatively.

This study, different from other studies in existing literature, examines whether the relative effective exchange rate has a threshold value depending on which it affects demand for tourism in Turkey. Besides, the effect of volatility in exchange rates on demand for tourism in Turkey has been analyzed.

3. The model, data, and methodology

This study investigates whether the relationship between the relative real effective exchange rate and demand for international tourism in Turkey depends on the threshold level of the change in the real effective exchange rate of Turkey relative to the real effective exchange rate of other 29 OECD countries covering the period from 2002 to 2018. The real effective exchange rate is defined as the weighted average of a country's currency in relation to an index or basket of other major currencies. To this end, we start with the traditional linear regression model that relates the relative real effective exchange rate to demand for international tourism in Turkey:

$$lnNT_{Turkey,t} = \beta reer\_gr_{it} + \lambda X_{it} + \varepsilon_{it} \quad (1)$$

where, subscripts i = 1, …, N refers to the individual country, and t = 1, …, T indexes time. As often emphasized in the tourism literature, the number of tourist arrivals can be an appropriate measure of tourism demand. In conjunction with the literature, $lnNT_{it}$ represents our proxy for tourism demand measured by the logarithmic levels of the number of tourist arrivals as the dependent variable; reer_grit is the percentage change in the relative real effective exchange rate; X is a set of other explanatory variables; and εit is the white noise error term. The relative real effective exchange rate is given by:

$$reer_{it} = \frac{reer_{Turkey,t}}{reer_{origin,t}} \quad (2)$$

where, $reer_{Turkey,t}$ is the real effective exchange rate in Turkey, and $reer_{origin,t}$ is the real effective exchange rate in the country of origin i at time t. To determine the effects of other macroeconomic variables related to demand for international tourism in Turkey, the natural logarithm of real GDP per capita of the origin countries (lnGDP_pc), the relative real effective exchange rate volatility (reer_vol), and population growth rate of the origin countries (pop_gr) are included in the model as explanatory variables.

Given that tourism is a normal good, an increase in the origin country's income might be expected to have a positive impact on demand for tourism (Vogt and Wittayakorn, 1998). Similarly, when the number of individuals of the origin countries is considered as an element of international tourism, a change in the population of the origin countries may have an impact on the demand for international tourism in Turkey. In the tourism literature, up to our knowledge, none of the studies incorporate the relative real effective exchange rate volatility into the international tourism demand models. To shed more light on uncertainty about the relative pricing in tourism supply generated by the relative real effective exchange rate volatility, we computed the relative real effective exchange rate volatility (reer_vol) for each year and for each country as the sample standard deviation of the ratio of the real effective exchange rate of the destination country to the real effective exchange rate of the origin countries:

$$\sqrt{\frac{\sum_{i=1}^{N}(p_i-\overline{p})^2}{\mathrm{T}-1}} \quad (3)$$

where p_i and $\overline{p}$ are the ratios of the real effective exchange rate of Turkey to the real effective exchange rate of the origin country and the average of the relative real effective exchange rate, respectively, and *T* denotes the number of years.

According to Kremer et al. (2013), there is a trade-off between bias and the efficiency of the estimators in finite samples due to the number of instrumental variables. Therefore, following Arellano and Bover (1995) and Kremer et al. (2013), we use lags of the growth rate of the dependent variable ($initial_{it-p}$) as instrumental variables to increase the efficiency of the estimators. Further, we also use one lagged value of the growth rate of the dependent variable as an instrumental variable for robustness check and report, similarly with Kremer et al. (2013), that the choice of the number of instruments has no important impact on our results, see Table 4 in the Appendix.

We included the lagged value of the growth rate of the number of international tourist arrivals in Turkey ($initial_{it-1}$) as an instrumental variable based on the assumption that international tourist receipts of Turkey and the relative real effective exchange rate

are not entirely independent of the previous periods. Table 1 depicts the data description of the related series.

Table 1. Data description, 2002-2018

Variable	Description	Source
lnNT	Natural logarithm of international tourist arrivals in Turkey	TUIK
reer_gr	The percentage change in the relative real effective exchange rate between Turkey and the origin countries	OECD-WB
initial	The lagged growth rate of the tourist arrivals in Turkey	
lnGDP_pc	Natural logarithm of the real gross domestic product per capita of each of the origin countries	WB
reer_vol	The relative real effective exchange rate volatility	OECD-WB
pop_gr	The growth rate of the population of the origin countries	WB

Source: (i) OECD database, (ii) TUIK: Turkish Statistical Institute, (iii) World Bank data.

Following data descriptions as presented in Table 1, Table 2 depicts the descriptive statistics of lnNT, reer_gr, initial, lnGDP_pc, reer_vol, and pop_gr, respectively. The maximum and minimum points of the natural logarithm of international tourist arrivals in Turkey are 6.747 and 3.006, respectively. Similarly, the maximum and minimum points of the sample standard deviation calculated to capture possible potential significant extreme points of the fluctuations of the ratio of the real effective exchange rates are 0.378 and 0.002, respectively.

Table 2. Descriptive statistics, 2002-2018

	lnNT	reer_gr	initial	lnGDP_pc	reer_vol	pop_gr
Mean	5.228	0.007	0.077	4.564	0.091	0.004
Median	5.290	0.004	0.063	4.405	0.085	0.004
Maximum	6.747	0.905	1.182	5.049	0.378	2.041
Minimum	3.006	-0.216	-0.735	3.945	0.002	-1.700
Std Dev.	0.682	0.128	0.263	0.248	0.075	0.254
Observations	493	493	493	493	493	493

Source: Authors' own calculations based on data from (i) OECD database, (ii) TUIK: Turkish Statistical Institute, (iii) World Bank data.

Note: The sample consists of annual observations from 2002 to 2018 for 29 OECD countries.

To examine whether a threshold effect exists between the percentage change in the relative real effective exchange rate and demand for international tourism, the panel threshold model developed by Hansen (1999) was used and can be expressed as follows:

$$y_{it} = \mu_i + \beta_1 X_{it} I(reer\_gr_{it} \leq \gamma) + \beta_2 X_{it} I(reer\_gr_{it} > \gamma) + \varepsilon_{it} \quad (4)$$

where μ_i represents country-specific fixed effects that capture country heterogeneity. I (·) is the indicator function showing the regime defined by the threshold variable (reer_grit) and the threshold parameter (γ). ε_{it} refers to the error term with zero mean and constant variance. X_{it} is an m-dimensional vector of the set of explanatory variables that can contain lagged values of the dependent variable and other exogenous variables. In the dynamic model, the explanatory variable vector is divided into two subgroups: X_{1it} for exogenous variables unrelated to the error term and X_{2it} for intrinsic variables associated with the error term (Kremer et al., 2013).

According to Kremer et al. (2013), the biggest limitation of Hansen (1999) panel threshold model is the assumption that all right-hand-side variables are imposed as exogenous variables in the model. In this case, all the explanatory variables in the X_{it} vector are unrelated to the error term. Caner and Hansen (2004) developed an instrumental variable threshold model for dynamic models based on cross-sectional data, which is an extended version of Hansen's (1999) static model, to solve the problem of endogeneity. In our model, the dynamic panel threshold model that allows for the endogeneity of regressors and threshold variables can be expressed as:

$$y_{it} = \mu_i + \beta_1 reer\_gr_{it} I[(reer\_gr_{it} \leq \gamma) + \delta_1 I(reer\_gr_{it} \leq \gamma)]$$

$$+\beta_2 reer\_gr_{it} I(reer\_gr_{it} > \gamma) + \lambda X_{it} + \varepsilon_{it} \quad (5)$$

In our model estimations, following Kremer et al. (2013)'s model, $reer_{it}$ was used as both a threshold and regime dependent variable. X_{it}, is an m-dimensional vector of the set of explanatory variables that can contain lagged values of the dependent variable and other exogenous variables. The lagged values of the growth rate of the dependent variable ($initial_{it-1}$) are included as intrinsic variables. Following models by (Bick, 2010) and Kremer et al. (2013), we allow differences in regime constant (δ_1).
In the estimation of Eq. (5), the country-specific fixed effect (μi), should be eliminated through fixed effect transformation. According to Kremer et al. (2013), inducing fixed effects (within transformation) or differencing leads to inconsistent predictions. Therefore, the forward orthogonal deviation method proposed by Arellano and Bover (1995) was used as the transformation method to ensure that the error terms obtained from the transformation are not correlated.

In our model, the number of tourist arrivals is included in the model, and it is assumed that this variable is affected by the relative real effective exchange rate. On the other hand, determining the number of tourist arrivals and at least one of the independent variables in the model simultaneously can cause potential endogeneity problems. To solve this problem, the two-stage least squares (2SLS) method is used in the model.
The first step in the procedure following Caner and Hansen (2004) is to estimate the reduced form regression for endogenous variables (X_{2it}) as a function of all exogenous tools consisting of the lagged values of the dependent variable. The endogenous variables (X_{2it}) are then replaced by the predicted values (X_{2it}) from the first step regression in Equation 4. Finally, equation (5) is estimated by the least-squares method for a fixed threshold (γ). The step is repeated for all possible threshold values, by expressing the sum of the squares of the remainder as S (γ), the threshold value ($\gamma\hat{}$) that minimizes the sum of S (γ) squares is chosen (Hansen, 2000).

$$\hat{\gamma} = \arg min_{\gamma}\ S_{\mathrm{n}}(\gamma) \tag{6}$$

According to Hansen (1999) and Caner and Hansen (2004), the critical values for determining the confidence interval of the relative real effective exchange rate threshold (1-α) are given as follows:

$$\Gamma = \{\gamma : LR(\gamma) \leq C(\alpha)\} \tag{7}$$

where the critical value, C(α), likelihood ratio statistic LR (γ) is the percentile of the asymptotic distribution (1- α). This predicted threshold divides the sample into two regimes. The slope parameters β_1 and β_2 of this equation can be found by applying the generalized method of moments (GMM) to these sub-examples (Caner & Hansen, 2004; Kremer et al., 2013).

4. Empirical findings

This study examines whether the effect of the relative real effective exchange rate on demand for international tourism in Turkey changes according to the threshold level of the change in the relative real effective exchange rate. To this end, yearly data covering the period from 2002 to 2018 on 29 OECD countries are utilized. The obtained findings are presented in Table 3.

The upper part of the table shows the estimated threshold value and the corresponding 95% confidence interval. The construction of the confidence intervals for our single threshold model is shown in Fig. 1. As shown in the table, the estimated threshold value for the percentage change in the relative real effective exchange rate is 1.023%. At the 95% confidence interval, 0.882 and 1.047 are the respectively lower limit and upper limit in our model.

In the second part of Table 3, $\hat{\beta}_1$ indicates the marginal effect of the change in the relative real effective exchange rate on international tourism demand for Turkey in the low percentage change regime, while $\hat{\beta}_2$ denotes the marginal effect of the change in the

relative real effective exchange rate on international tourism demand for Turkey in the high percentage change regime. As shown in the table, $\hat{\beta}_2$ is statistically significant while $\hat{\beta}_1$ is not statistically significant. These results show that changes in the relative real effective exchange rate below the threshold level have no effect on demand for international tourism in Turkey. In contrast, above the threshold level, it has a stronger effect in the model.

Table 3. Tourism demand and the relative real effective exchange rate

Estimated threshold value (reer_gr)	
$\hat{\gamma}$	1.023%*
95% confidence interval	
$[0.882, 1.047]$	
Impact of the percentage change in the relative real effective exchange rate (reer_gr)	
$\hat{\beta}_1$	-0.075
	(0.188)
$\hat{\beta}_2$	-0.321*
	(0.131)
Impact of control variables	
$initial_{it}$	0.005
	(0.033)
$lnGDP\_pc_{it}$	2.182*
	(0.297)
$reer\_vol_{it}$	-0.511*
	(0.113)
pop_gr_{it}	-0.033
	(0.023)
$\hat{\delta}_1$	0.079*
	(0.023)
Number of observations	
reer_gr $\leq \hat{\gamma}$	308
reer_gr $> \hat{\gamma}$	185
Number of countries	29

Notes: Table 3 reports results for the dynamic panel threshold model using 4 lags of the instrument variable in the model. There are 493 observations in total, with the first regime and the second regime including 308 and 185 observations, respectively. Standard errors

are given in parenthesis and * indicates significance at 1% level. In conjunction with Hansen (1999) and Kremer et al. (2013), each regime contains at least 5% of all observations in our model.

As can be seen in the last part of the table, we use the lagged growth rate of tourist receipts of Turkey ($initial_{it-1}$), real GDP per capita of the origin countries (lnGDP_pc), the relative real effective exchange rate volatility (reer_vol), and population growth rate of the origin countries (pop_gr) as explanatory variables in order to control the effects on demand for international tourism in Turkey. As a result, we found that real GDP per capita of the origin countries has a positive and statistically significant effect on tourism demand for Turkey. This result indicates that an increase in the income of the origin countries, in accordance with the tourism literature, will increase international tourism demand for Turkey. On the other hand, we reached a conclusion that the volatility in the ratio of the real effective exchange rate of Turkey to the real effective exchange rate of the origin countries has a negative impact on tourism demand for Turkey. In line with the findings of (Song et al. 2010; Ibrahim, 2011), the population variable does not have a significant effect on tourism demand for Turkey.

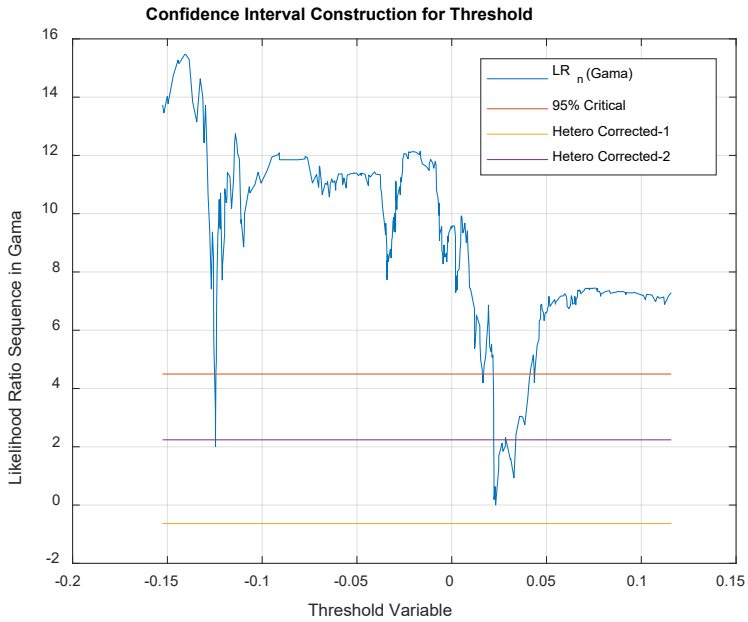

Fig. 1. The sum of the squared errors of the threshold values

Therefore, contrary to the linearity hypothesis implying that the effect of the percentage change in the relative real effective exchange rate on international tourism demand is the same during the intense and even periods, the relationship between these variables is non-linear, and the impact on international tourism demand for Turkey depends on the threshold level of the change in the relative real effective exchange rate.

5. Conclusion

The tourism industry has experienced a rapidly growing trend, especially after World War II with recent developments in communication and transportation technologies. Nowadays, the tourism industry contributes to global GDP by approximately 10%. Along with the crucial role of the tourism industry, the determination of factors influencing demand for tourism deserves further investigation. In the existing literature, the impact of foreign exchange rates on demand for tourism was generally assumed as linear. However, the impact of a change for each level on foreign exchange rates may be significantly different.

This paper investigates whether there exists a significant threshold level for foreign exchange rates on the impact of demand for tourism using the dynamic panel threshold model. The empirical findings reveal that there exists a significant threshold level for the ratio of Turkey's real foreign exchange rates to tourist country of origin's real foreign exchange rates, and this value was found as 1.023%. Accordingly, values below this level were not found as statistically significant, and values that exceed this level were statistically significant and negative. In addition, the impact of the volatility of foreign exchange rates on demand for tourism in Turkey was also investigated. The empirical findings also indicated that the impact of the volatility of foreign exchange rates was found to be statistically significant and negative. This evidence can be interpreted as the volatility of real foreign exchange rates tends to have a negative impact on tourism demand by increasing the uncertainty. In order to achieve sustainable tourism revenues and a competitive tourism supply, future policies should concentrate on real foreign exchange stability. In the case of the Turkish economy, one might claim that the most important determinant of the real exchange rate volatility is the balance of payments deficit. In this context, policies mitigating the balance of payments deficit might increase tourism demand for Turkey by decreasing the real exchange rate volatility. Further investigations which will examine the impact of exchange rate volatility on tourism demand might calculate exchange rate volatility using high-frequency data through different methods and include in the analysis.

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APPENDIX

Table 4. Tourism demand and the relative real effective exchange rate: Estimation with reduced instrument count

Estimated threshold value (reer_gr)	
$\hat{\gamma}$	1.023%*
95% confidence interval	[0.882, 1.047]
Impact of the percentage change in the relative real effective exchange rate (reer_gr)	
$\hat{\beta}_1$	-0.083
	(0.191)
$\hat{\beta}_2$	-0.323*
	(0.131)
Impact of control variables	
$initial_{it}$	-0.018
	(0.036)
$lnGDP\_pc_{it}$	2.178*
	(0.302)
$reer\_vol_{it}$	-0.507*
	(0.114)
pop_gr_{it}	-0.033
	(0.023)
$\hat{\delta}_1$	0.080*
	(0.023)
Number of observations	
reer_gr $\leq \hat{\gamma}$	308
reer_gr $> \hat{\gamma}$	185
Number of countries	29

Notes: Table 4 reports results for the dynamic panel threshold model using only one instrument lag. First and second regimes contain 308 and 185 observations, respectively. Standard errors are given in parenthesis and * indicates significance at 1% level.