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ANALYZING THE IMPACT OF INTERNATIONAL TOURISM ON ECONOMIC GROWTH IN TURKEY

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ABSTRACT

Using quarterly data and two different indicators of the volume of international tourism, namely the international tourist expenditures and the total number of international tourist arrivals, this paper aims to investigate whether tourism has been a vehicle of economic growth in Turkey. We use the ARDL approach to cointegration and error correction model and find evidence of long-run uni-directional causality running from the volume of international tourism (both the tourist expenditures and tourist arrivals) and real exchange rates to economic growth, but not vice versa. The results indicate that the Turkish case supports the tourism-led growth hypothesis.

Keywords*: Turkey, International Tourism, Economic Growth, Causality.*

TÜRKİYE'DE ULUSLARARASI TURİZMİN EKONOMİK BÜYÜMEYE ETKİSİNİN ANALİZİ

ÖZET

Bu makalenin amacı, uluslararası turizmin hacmini ölçmede kullanılan iki farklı gösterge olan uluslararası turist harcamaları ve uluslararası gelen turist sayısı değişkenlerine ait çeyrek yıllık verileri kullanarak turizmin ekonomik büyümenin bir aracı olup olmadığını incelemektir. Çalışmada, ARDL yaklaşımı kullanılarak uluslararası turizmin hacminden (turist harcamaları ve gelen turist sayısı değişkenlerinin her ikisinden) ekonomik büyümeye doğru tek yönlü bir nedensellik bulunmuştur. Bu sonuca göre Türkiye örneği turizmin önderliğinde büyüme hipotezini desteklemektedir.

Anahtar Kelimeler: *Türkiye, Uluslararası Turizm, Ekonomik Büyüme, Nedensellik.*

1. INTRODUCTION

Empirical research on the tourism-growth nexus studies the impact of international tourism on economic growth. The tourism-led growth hypothesis suggests that international tourism plays an important role in economic growth. The relationship between international tourism and economic growth has been a subject of great interest and debate among economists in recent years. The debate has traditionally analyzed whether expansion in tourism industry results in a faster economic growth. International tourism provides substantial economic benefits to host countries. International tourism receipts are major source of foreign exchange, especially for less-developed countries confronted by foreign exchange constraints (Oh, 2005). Therefore, promoting tourism industry in those countries has become a primary development strategy because tourism receipts together with export revenues that well ameliorate current account deficits (Oh, 2005). Furthermore, since international tourism contributes to every single economic sector, budget deficits may be ameliorated by these contributions through increments of the tax revenues. McKinnon (1964) mentions that international tourism receipts may be considered as foreign exchange transfers that may be used to import intermediate and capital goods to produce goods and services, leading to a faster economic growth and increases in employment. International tourism leads to increases in output by promoting efficiency through competition between local firms and the ones corresponding to other international tourist destinations (Bhagwati and Srinivasan, 1979; Krueger, 1980). International tourism also leads to exploitation of economies of scale in local firms (Helpman and Krugman, 1985). Compared to a large body of literature investigating the export-led growth hypothesis, both at the theoretical and empirical level, economists have paid scant attention to studying the tourism-led growth hypothesis (Gunduz and Hatemi-J, 2005; Balaguer and Cantavella-Jorda, 2002). Empirical studies investigating the relationship between international tourism and economic growth provide rather ambiguous results (Gunduz and Hatemi-J, 2005).

The importance of international tourism to the Turkish economy as a major source of income is very well recognized by the policy-makers in Turkey. At the outset of the 1980s, Turkish authorities initiated a far-reaching financial liberalization and economic stabilization program to ameliorate and stabilize the internal and foreign balances of the economy. Perhaps the most striking characteristic of the major stabilization and liberalization program was the clear enunciation of the new approach, ending the import substitution policy and favouring an outward-orientated policy, i.e. an export-driven one. The authorities have given priority to the development of tourism industry as part of their export-led economic growth strategy. Tourism sector has been described by the authorities as "the industry without chimney". Growth of tourism industry has been regarded as an important source of balance of payments surpluses and as an additional revenue source for GDP. Turkish government have mainly promoted large scale, capital-intensive tourism and hospitality projects such as beach resorts, high-rise grand hotels, lodges and condominiums. Most have been initiated through government subsidizes. Tourism is an important industry for Turkey and represents one of the most important sources of foreign currency earnings. Statistics indicates that number of tourist arrivals, tourism receipts, and the percentage share of tourism receipts both in GDP and in exports increased substantially since 1970 (see Table 1). For instance, the percentage share of tourism receipts in GDP was only 0.5 in 1970; it rapidly increased to 2.8 in 2007. While Turkey hosted 724,784 tourists in 1970 and earned around US$52 millions, the number of tourist arrivals increased to 23 millions and earned around US$19 billions in 2007. Similarly, while the percentage share of tourist expenditures in exports was 8.8 in 1970, it reached to 17.3 in 2007 (Tourism Statistics, 2000-2008; Economic Indicators, 2008). According to the literature and stylised facts a strong positive relationship between economic growth and international tourism is expected to exist in the case of Turkey, no matter how simple or complex this relationship can be. However, empirical evidence on the relationship between the volume of international tourism and economic growth seems paradoxically puzzling. As a matter of fact, despite the importance of tourism industry for the Turkish economy, only a few empirical studies have been dedicated to its analysis.

Table 1: The Average Tourist Expenditures, Average Number of Tourist Arrivals and Average Share of Tourist Expenditures in Gdp And in Exports and Average Expenditures Per Tourist

Periods	Tourist Expenditures (in million US$)	Number of Tourist Arrivals	% Share of Tourist Expenditures in GDP	% Share of Tourist Expenditures in Exports	Average Expenditures per Tourist (US$)
1963-1972	20.9	478 318	0.19	5.42	49.52
1973-1982	195.59	1 374 686	0.54	10.92	177.89
1983-1992	1 455.76	2 842 196	1.76	18.21	509.91
1993-2002	5 422.85	7 946 336	3.03	27.02	755.99
2003-2007	16 516.42	18 744 013	3.64	23.01	1404.02

Sources: Author's calculations based on Tourism Statistics (2000-2008), The Ministry of Culture and Tourism; and Turkey's Statistical Yearbook 2006 and 2007; and Economic Indicators 2008; and Statistical Indicators 1923-2006, Turkish Statistical Institute.

Ambiguous results of the empirical works may stem from the following reasons: relative weight of international tourism in the economies, using different econometric techniques, and missing crucial explanatory variables such as real exchange rates (Gunduz and Hatemi-J, 2005), and perhaps most importantly, poor quality of data. Balaguer and Cantavella-Jorda (2002) provide strong support for the tourism-led growth hypothesis in Spain which is a famous tourist destination and the second largest recipient of international tourism revenues (5.9% of its GDP) next to the US (Katircioglu, 2009). Dristakis (2004) investigates the role of international tourism on economic growth in Greece and provides evidence of bi-directional causality between international tourism and economic growth. Dristakis (2004) concludes that both the tourism-led growth and growth-led tourism hypotheses are valid for the Greek economy. Brida et al. (2008) examine the validity of the tourism-led growth hypothesis for the Mexican economy and find evidence of uni-directional causality running from international tourism to economic growth. Nevertheless, Oh (2005) does not find a long-run cointegrating relationship between tourism and economic growth for the Korean economy. Oh (2005) further argues that validity of tourism-led growth hypothesis for an economy is closely related to the relative weight of tourism revenues in its GDP. Kim et al. (2006) report a bi-directional causality between economic growth and international tourism for Taiwan. That is, both the tourism-led growth and growth-led tourism hypotheses are applicable to the Taiwanese economy in which the relative weight of tourism revenues in Taiwanese GDP is very similar to that of Korea.

As for the Turkish case, most recent works on this topic are as follows: Ongan and Demiroz (2005) find a bi-directional causality between the volume of international tourism and economic growth. They suggest that both the tourism-led growth and the growth-led tourism hypotheses hold in the case of Turkey. Gunduz and Hatemi-J (2005) provide strong support for the tourism-led growth hypothesis and report a uni-directional causality running from international tourism to economic growth. Kaplan and Çelik (2008) find evidence of one-way causality running from international tourism to economic growth and provide support for the tourism-led growth hypothesis, whereas Katircioglu (2009) finds no long-run cointegrating relationship between international tourism and economic growth and suggests that the data rejects the tourism-led growth hypothesis for Turkey during the period 1960-2006. The empirical evidence seems puzzling *vis-à-vis* the expected existence of a positive relationship between international tourism and economic growth in Turkey. However, more research is required into this relationship for the empirical findings are mixed and inconclusive whether the tourism-led growth hypothesis is applicable to the Turkish economy. This is particularly remarkable and concerns important policy implications because, as in the case of Turkey, most of the developing countries have intensively invested in tourism industry as part of their long-term economic development strategy (Brohman, 1996).

The main objective of this paper is to verify if there is and what is the relationship among economic growth, international tourism and real exchange rates. The motivation of this study is as follows: the relative weight of tourism industry in the Turkish economy and scant attention to its empirical analysis provide a good rationale to study the relationship between international tourism and economic growth. This research paper makes two contributions to the existing literature on the tourism-economic growth nexus. The first contribution is that it examines the tourism-growth nexus using causality testing within a multivariate cointegration and error-correction framework. Secondly, we estimate the economic growth, international tourism and real exchange rate elasticities both in the short-run and long-run using recent advances in time series econometrics which is the bounds testing approach to cointegration, with an

Autoregressive Distributive Lag (ARDL) framework, developed by Pesaran and others (Pesaran and Pesaran, 1997; Pesaran and Shin, 1999; Pesaran et al., 2001). Following the introduction, we discuss data, and then present some results, finishing with the conclusions.

2. DATA

Quarterly data set for Turkey includes real gross domestic product (Y_t), real tourist expenditures ($TOUR_t$) and international tourist arrivals ($NTOUR_t$) and real exchange rates (RER_t). Real GDP (Y_t) is included to represent economic growth and obtained by deflating nominal GDP by the consumer price index (2000 = 100) of Turkey. Although theory does not provide us with a foundation for any unique indicator of the volume of international tourism, there are several measures used in the empirical studies as a proxy for the volume of international tourism (see Gunduz and Hatemi-J, 2005). The first measure is tourist expenditures, which are the volume of international tourism receipts obtained from foreign tourists. The second measure is the number of nights spent by foreign tourists in the host country. The third measure is the total number of tourist arrivals. We make use of both international tourist expenditures in the host country ($TOUR_t$) and total number of foreign tourist arrivals ($NTOUR_t$) to represent the volume of tourism in two different models. The data series of real international tourist expenditures are generated by multiplying nominal tourist expenditures series in US dollars with nominal TL per US dollar exchange rates and then deflating it by consumer price index (2000 = 100) of Turkey. Real exchange rates (RER_t) are included in the model so as to tackle with potential omitted variable problem. We calculate the real exchange rates by multiplying nominal TL per US dollar exchange rate with the consumer price index (2000 = 100) of the US and dividing it by consumer price index (2000 = 100) of Turkey. We use two different models with the alternative volume of tourism variables, namely the international tourist expenditures and the total number of tourist arrivals. The model with the tourist expenditures data series spans the period 1985:Q1-2008:Q3, which is constrained by data availability of tourist expenditures series. The model with the tourist arrivals covers the period 1984:Q1-2008:Q3, which is due to a lack of suitable quarterly data on tourist arrivals prior to 1984. Accordingly, our sample period may be considered sufficiently long enough to detect an equilibrium type relationship as it gives us 24 years of data and 99 observations. Using quarterly data series rather than annual or monthly time series may be more consistent with the seasonal pattern of tourism as well with the economic activity. The international tourist expenditures and tourist arrivals series are obtained by converting monthly figures into quarterly figures and collected from *Turkey's Statistical Yearbook 2006* and *2007*, and *Economic Indicators 2008* of the Turkish Statistical Institute; and *Tourism Statistics (2000-2008)* of The Ministry of Culture and Tourism of Turkey and online data delivery system of *The Central Bank of the Republic of Turkey*. The consumer prices indices are taken from *OECD*'s online data delivery system. The rest of the variables, namely, nominal GDP and nominal TL per US dollar exchange rate series are obtained from *The Central Bank of the Republic of Turkey*'s online data delivery system. The data series are expressed in natural logarithms. To conduct the unit root tests and the Census X12 seasonal adjustment procedure, Eviews 5.1 has been used. The rest of the tests has been carried out by Microfit 4.0.

3. ESTIMATION RESULTS

An important preliminary analysis of the models is to test for the order of integration of the variables entering into the models, and to check clearly whether they have a unit root. We present unit root tests for the variables so as to investigate the time series characteristics of the data and consistency in the subsequent econometric modelling. For this purpose, we perform two commonly used unit root tests, namely the Augmented Dickey-Fuller (ADF) test (Dickey and Fuller, 1981) and Phillips-Perron (PP) test (Phillips and Perron, 1988), and a relatively new and more powerful generalized least squares (GLS)-detrended Dickey–Fuller (DF-GLS) unit root test proposed by Elliot et al. (1996). The PP test uses the same critical values of the ADF test, which are from MacKinnon (1991), whereas the critical values of DF-GLS test are tabulated in Elliot et al. (1996). Table 2 reports the results of the unit root tests. The statistics for the levels of [Y_t, $TOUR_t$, $NTOUR_t$, RER_t] do not exceed the critical values (in absolute terms). That is [Y_t, $TOUR_t$, $NTOUR_t$, RER_t] are integrated at order zero in the levels. When we take the first difference of each of the variables, the ADF, DF-GLS and PP statistics are higher than their respective critical values (in absolute terms). Therefore, we conclude that [Y_t, $TOUR_t$, $NTOUR_t$, RER_t] appear to contain a unit root in their levels but stationary in their first differences, indicating that they are integrated at order one, i.e., $I(1)$, which implicitly indicates a real GDP growth with a long-term constant mean, and increases in the volume of international tourism at a steady rate in the long term.

Table 2: Results of the Unit Root Tests

	Test Statistics					
	Intercept	Intercept and Trend	Intercept	Intercept and Trend	Intercept	Intercept and Trend
Variables	ADF	ADF	PP	PP	DF-GLS	DF-GLS
ln*Y*	-0.2 (1)	-2.9 (3)	-0.2 (8)	-2.3 (8)	2.3 (3)	-2.6 (3)
ln*TOUR*	0.5 (3)	-2.3 (3)	2.5 (6)	-1.7 (5)	0.6 (3)	-1.2 (3)
ln*NTOUR*	-1.9 (7)	-1.8 (7)	-2.3 (1)	-2.3 (1)	-0.8 (7)	-1.7 (7)
ln*RER*	-0.8 (4)	-2.4 (4)	1.3 (4)	0.2 (4)	0.1 (4)	-2.8 (4)
Δln*Y*	-10.6*(0)	-10.6*(0)	-11.1* (6)	-11.1* (6)	-5.5* (2)	-10.5* (0)
Δln*TOUR*	-5.6* (2)	-5.1* (2)	-4.4* (4)	-4.8* (4)	-5.8* (2)	-5.2* (2)
Δln*NTOUR*	-11.8* (0)	-12.2* (0)	-11.9* (4)	-12.2* (4)	-11.6* (0)	-12.2* (0)
Δln*RER*	-4.4* (3)	-4.8*(3)	-10.9* (4)	-11.1* (4)	-4.6* (3)	-4.9* (3)

Notes:* denotes rejection of the null hypothesis at the 1% significance level. The maximum available sample is used and varies across the null order. Performing the ADF and DF-GLS unit root tests, the optimum lag length was chosen based on the evidence provided by Schwarz Bayesian Criterion (SBC) - up to 8 lags. To perform the non-parametric correction to the PP statistic, we use the Newey-West adjusted variances with Barlett-Kernel weights. **Δ** is the first difference operator. The order of lags is expressed in parentheses.

To examine the long-run relationship between [Yt, TOURt, NTOURt, RERt], we employ bounds testing approach to cointegration within the framework of ARDL developed by Pesaran et al. (2001). There are several reasons for the use of bounds test. Firstly, the bi-variate cointegration test introduced by Engle and Granger (1987) and the multivariate cointegration technique proposed by Stock and Watson (1988), Johansen (1988, 1991) and Johansen and Juselius (1990) may be appropriate for large sample size. However, estimates using the Engle and Granger and Johansen methods of cointegration are not robust for small sample sizes (Mah, 2000). Pesaran and Shin (1999) show that with the ARDL framework, the OLS estimators of the short-run parameters are $\sqrt{T}$ consistent and the ARDL-based estimators of the long-run coefficients are super-consistent in small sample sizes, and therefore more robust and performs better for small sample sizes than other cointegration techniques (Pesaran et al., 2001; Tang, 2001 and 2002). As Hakkio and Rush (1991) argue that increasing the number of observations through using monthly or quarterly data does not add robustness to the cointegration results because what matters is the length of the period rather than the number of observations. Carruth et al. (2000, p. 289) argue that "single equation methods have been criticized because they ignore the possibility of multiple vectors but, in practice, they can give eminently sensible results (albeit of a reduced form nature) and generate adequate dynamic models". Carruth et al. (2000) suggest that the likelihood of multiple cointegrating vectors does not facilitate the identification of the possible static long-run cointegration between the variables. They further argue that "the possibility of multiple cointegration vectors can lead to severe identification problems, requiring researcher to provide an economic interpretation of the relationships that are identified. Moreover, the number of significant cointegrating vectors found is often dependent on the length of the lags chosen for the VAR, so careful reduction tests are called for" (Carruth et al., 2000, p. 289). Secondly, the bounds testing approach avoids the pre-testing of unit roots. This method does not require that the variables in a time series regression equation are integrated of order one. Bounds test could be implemented regardless of whether the underlying variables are I(0), I(1), or fractionally integrated. Thirdly, the long run and short run parameters of the model are estimated simultaneously to tackle with the problem of endogeneity and simultaneity. The ARDL bounds testing approach to cointegration involves investigating the existence of a long-run relationship using the following unrestricted error-correction models (UECM):

$$\Delta \ln Y_t = \alpha_{0Y} + \sum_{i=1}^{p} \alpha_{iY} \Delta \ln Y_{t-i} + \sum_{i=0}^{p} \alpha_{iY} \Delta \ln X_{t-i} + \sum_{i=0}^{p} \alpha_{iY} \Delta \ln Z_{t-i} + \sigma_{1Y} \ln Y_{t-1} + \sigma_{2Y} \ln X_{t-1} + \sigma_{3Y} \ln Z_{t-1} + \varepsilon_{1t} \quad (1)$$

$$\Delta \ln X_t = \alpha_{0X} + \sum_{i=1}^{p} \alpha_{iX} \Delta \ln X_{t-i} + \sum_{i=0}^{p} \alpha_{iX} \Delta \ln Y_{t-i} + \sum_{i=0}^{p} \alpha_{iX} \Delta \ln Z_{t-i} + \sigma_{1X} \ln X_{t-1} + \sigma_{2X} \ln Y_{t-1} + \sigma_{3X} \ln Z_{t-1} + \varepsilon_{2t} \quad (2)$$

$$\Delta \ln Z_t = \alpha_{0Z} + \sum_{i=1}^{p} \alpha_{iZ} \Delta \ln Z_{t-i} + \sum_{i=0}^{p} \alpha_{iZ} \Delta \ln Y_{t-i} + \sum_{i=0}^{p} \alpha_{iZ} \Delta \ln X_{t-i} + \sigma_{1Z} \ln Z_{t-1} + \sigma_{2Z} \ln Y_{t-1} + \sigma_{3Z} \ln Z_{t-1} + \varepsilon_{3t} \quad (3)$$

where Δ is the first difference operator, ln Y_t is the log of the dependent variable and ln X_t and ln Z_t are the logs of the independent variables, and ε_{1t}, ε_{2t} and ε_{3t} are serially independent random errors with mean zero and finite covariance matrix. The hypotheses can be examined using the standard *F*-statistics for investigating a long-term relationship in a tri-variate system. The *F*-test is used to determine whether a long-run relationship exists among the variables through testing the significance of the lagged levels of variables. When a long-run relationship exists between the variables, the *F*-test indicates which variables should be normalized. In Eq. (1), where is ln Y_t the dependent variable, the null hypothesis of no cointegration between the variables is ($H_0 : \sigma_{1Y}=\sigma_{2Y}=\sigma_{3Y}= 0$) against the alternative hypothesis of conitegration ($H_1 : \sigma_{1Y} \neq \sigma_{2Y} \neq \sigma_{3Y} \neq 0$). In Eq. (2), where ln X_t is the dependent variable, the null hypothesis for cointegration is ($H_0 : \sigma_{1X}=\sigma_{2X}=\sigma_{3X}=0$) against the alternative ($H_1 : \sigma_{1X} \neq \sigma_{2X} \neq \sigma_{3X} \neq 0$). In Eq. (3), where ln Z_t is the dependent variable, the null hypothesis for cointegration is ($H_0: \sigma_{1Z}=\sigma_{2Z}=\sigma_{3Z}=0$) against the alternative ($H_1: \sigma_{1Z} \neq \sigma_{2Z} \neq \sigma_{3Z} \neq 0$).

The *F* test has a non-standard distribution which depends on: (i) whether variables included in the ARDL model are *I*(1) or *I*(0), (ii) the number of regressors and

(iii) whether the ARDL model contains an intercept and/or a trend. Two sets of critical values which provide critical value bounds for all classifications of the regressors into purely $I(1)$, purely $I(0)$ or mutually cointegrated. If the computed F-statistics falls outside the critical bounds, a conclusive decision can be made regarding cointegration without knowing the order of cointegration of the regressors. If the estimated F-statistic is higher than the upper bound of the critical values then the null hypothesis of no cointegration is rejected regardless of the order of integration of the variables. Alternatively, if the estimated F-statistic is lower than the lower bound of critical values, the null hypothesis of no cointegration cannot be rejected.

As we use quarterly data, all tests include a minimum of 4 and a maximum of 8 lags to ensure lagged explanatory variables are present in the ECM. Gonzalo (1994) suggests that the cost of over-parameterization in terms of efficiency loss is marginal. The order of lags for Eqs. (1)-(3) was obtained from unrestricted VAR by means of SBC, whilst ensuring there was no evidence of serial correlation (Pesaran et al., 2001). We tested for the presence of long-run relationships in Eqs. (1) to (3). The calculated F-statistics are reported in Table 3. From these results, it is clear that there is a long-run relationship among the variables when real income is the dependent variable since in each of the equations, the calculated F-statistics, namely $F\ (Y_t \mid TOUR_t, RER_t)$ and $F\ (Y_t \mid NTOUR_t, RER_t)$, appear to be higher than the upper bound critical value at 1% significance level. Thus, the null hypothesis of no cointegration cannot be accepted and there is a long-run cointegration relationship amongst the variables when the real GDP is the dependent variable. However, when the rest of variables, namely the real international tourist expenditures, the total number of tourist arrivals and the real exchange rates are the dependent variables, the null hypothesis of no cointegration is accepted because their calculated F-statistics are much smaller than lower bound critical value at the 10% significance level. Evidence of cointegration relationships among the variables confirms the robustness of the estimated relationship.

Table 3: Results of Bounds *F*-tests for ARDL Cointegration Relationship

Critical value bounds of the F-statistic						
k=2	**10% level**		**5% level**		**1% level**	
	$I(0)$	$I(1)$	$I(0)$	$I(1)$	$I(0)$	$I(1)$
	4.19	5.06	4.87	5.85	6.34	7.52
Dependent Variable			**Calculated F-statistics**		**Conclusion**	
$[\mathbf{Y_t} \mid TOUR_t, RER_t]$			10.46* [.000]		H_0: Rejected	
$[\mathbf{Y_t} \mid NTOUR_t, RER_t]$			12.34* [.000]		H_0: Rejected	
$[\mathbf{TOUR_t} \mid Y_t, RER_t]$			2.62 [.059]		H_0: Accepted	
$[\mathbf{NTOUR_t} \mid Y_t, RER_t]$			0.18 [.909]		H_0: Accepted	
$[\mathbf{RER_t} \mid Y_t, TOUR_t]$			1.14 [.335]		H_0: Accepted	
$[\mathbf{RER_t} \mid Y_t, NTOUR_t]$			0.68 [.565]		H_0: Accepted	

Notes: Critical values are obtained from Pesaran et al. (2001, pp. 300-301), Table CI (V): Unrestricted intercept and unrestricted trend. *k* denotes the number of regressors. Probability values are in square brackets. * denotes significance at the 1% level.

Given the existence of a long-run relationship among the variables when real GDP is the dependent variable, in this stage the ARDL cointegration and error correction procedure is implemented. [Y_t| $TOUR_t$, RER_t] is estimated using the following ARDL (*m,n,r*) specification:

$$\ln Y_t = \alpha_0 + \sum_{i=1}^{m} \alpha_1 \ln Y_{t-i} + \sum_{i=0}^{n} \alpha_2 \ln TOUR_{t-i} + \sum_{i=0}^{r} \alpha_3 \ln RER_{t-i} + \varepsilon_t \qquad (4)$$

[Y_t| $NTOUR_t$, RER_t] is estimated using the following ARDL (*p,q,w*) specification:

$$\ln Y_t = \pi_0 + \sum_{i=1}^{p} \pi_1 \ln Y_{t-i} + \sum_{i=0}^{q} \pi_2 \ln NTOUR_{t-i} + \sum_{i=0}^{w} \pi_3 \ln RER_{t-i} + \theta_t \qquad (5)$$

To estimate the parameters of Eqs. (4) and (5), maximum order of lag is set to 4 in order to minimize the loss of degrees of freedom. This stage involves estimating the long-run and short-run coefficients of Eqs. (4) and (5). The estimated models presented here are based on minimizing the SBC. The long-run results obtained through normalizing on the dependent variables and the short-run results together with standard diagnostic tests of Eqs. (4) and (5) are exhibited in Tables 4 and 5, respectively. For both of the equations, the short-run models pass all the standard diagnostic tests for residual serial correlation, functional form, normality and heteroscedasticity. The error correction terms, ECT_{t-1}, in the short-run error correction models are statistically significant with the plausible magnitudes and correct signs, which confirm existence of long-run equilibrium relationships between the variables and measure the speed of adjustment to obtain equilibrium in the event of shock(s) to the system. In Eq. (4), the error-correction coefficient is –0.33, which means that once shocked convergence to equilibrium is very slow with about 33 per cent of the adjustment occurring in the first year. In Eq. (5), the error correction coefficient is -0.68 which is larger than that of Eq. (4). Thus, the speed of adjustment is considerably fast in the case of any stochastic shock to the real GDP. In Eqs. (4) and (5), as expected, the elasticities of the volume of international tourism are much larger in the long run than in the short run, which suggests that tourism promoting policies will have stronger effects over time. In Eqs. (4) and (5), the elasticities of real GDP with respect to tourism are 0.66 and 0.42, respectively. This means that increasing the tourist expenditures by 100% produces an increment of 66% (42%) of the Turkish real product. It is clear from the results that it is a positive impact of tourism on economic growth both in the short run and in the long run. In Eq. (4), changes in real exchange rates appear to have negative effect on economic growth both in the long run and short run. Both the long-run and short-run elasticities of the real exchange rates are larger than those of international tourist expenditures. This indicates the negative impact of exchange rate policies on economic growth in Turkey. In Eq. (5), changes in real exchange rates appear to have no effect on economic growth in the short-run whereas they have a negative impact on economic growth in the long-run. Overall, the negative impact of the real exchange rates is due to implementation of over-valued domestic currency policies since 1988 when the Turkish lira was over-valued above and beyond the domestic and foreign inflation differential. As a matter of fact, the behaviour of the exchange rate discloses an overall tendency towards real appreciation when account is taken for the 1985-1994 period. The policy had an adverse effect on the external balance situation in the economy (Savas, 2002, p.59).

Table 4: Estimated Long-Run Coefficients and UECM Representation for Eq. (4): ARDL (1,3,0) selected based on the SBC

Estimated long-run coefficients			
Regressor	**Coefficient**	**Standard Error**	***t*-ratio [prob.]**
ln*TOUR*	0.6663^{a}	0.2003	3.3250 [.002]
ln*RER*	-0.7982^{a}	0.1890	-4.2219 [.000]
Constant	8.8958^{a}	3.0847	2.8838 [.005]
Estimated short-run coefficients			
Δln*TOUR*	0.2646^{a}	0.0284	9.3057 [.000]
Δln*TOUR(-1)*	0.0368^{c}	0.0185	1.9917 [.051]
Δln*TOUR(-2)*	-0.0662^{a}	0.0193	-3.4308 [.001]
Δln*RER*	-0.2699^{a}	0.0637	-4.2355 [.000]
Constant	3.0087^{c}	1.7342	1.7349 [.088]
ECT_{t-1}	-0.3382^{a}	0.0867	-3.9010 [.000]
Diagnostic Tests			
LM (4)	2.1975 [.138]	R^2	0.9205
Heteroscedasticity (1)	2.8951 [.089]	$\bar{R}^2$	0.9111
RESET (1)	0.0019 [.965]	***S.E. of Regression***	0.0776
Normality (2)	0.4355 [.509]	***DW***	2.0588

Notes*:* LM is the Lagrange Multiplier test of residual serial correlation. Heteroscedasticity test is based on the regression of squared residuals on squared fitted values. Ramsey's RESET test uses the square of the fitted values. Normality test is based on a test of skewness and kurtosis of residuals. Critical values of χ^2 (1), χ^2 (2) and χ^2 (4) are 3.8414, 5.9914, 9.4877 at the 5% significance level, respectively. Critical values of *t*-test are 1.671, 2.000 and 2.660 at the 10%, 5% and 1% significance levels, respectively. Probability values are in square brackets. a Significance at the 1% level. b Significance at the 5% level. c Significance at the 10% level.

Table 5: Estimated Long-Run Coefficients and UECM Representation for Eq. (5): ARDL (2,0,0) selected based on the SBC

Estimated long-run coefficients			
Regressor	**Coefficient**	**Standard Error**	***t*-ratio [prob.]**
ln*NTOUR*	0.4203^{a}	0.1200	3.5020 [.001]
ln*RER*	-0.3002^{c}	0.1521	-1.9742 [.058]
Constant	13.6312^{a}	1.6012	8.5132 [.000]
Estimated short-run coefficients			
Δln*Y(-1)*	0.2434^{b}	0.1053	2.3109 [.028]
Δln*NTOUR*	0.2900^{a}	0.0324	8.9294 [.000]
Constant	9.4051^{a}	3.0093	3.1254 [.004]
ECT_{t-1}	-0.6899^{a}	0.1425	-4.8393 [.000]
Diagnostic Tests			
LM (4)	1.9658 [.374]	R^2	0.9186
Heteroscedasticity (1)	0.2595 [.610]	$\bar{R}^2$	0.9078
RESET (1)	0.7420 [.389]	***S.E. of Regression***	0.0808
Normality (2)	1.3734 [.241]	***DW***	1.9100

Notes*:* LM is the Lagrange Multiplier test of residual serial correlation. Heteroscedasticity test is based on the regression of squared residuals on squared fitted values. Ramsey's RESET test uses the square of the fitted values. Normality test is based on a test of skewness and kurtosis of residuals. Critical values of χ^2 (1), χ^2 (2) and χ^2 (4) are 3.8414, 5.9914, 9.4877 at the 5% significance level, respectively. Critical values of *t*-test are 1.671, 2.000 and 2.660 at the 10%, 5% and 1% significance levels, respectively. Probability values are in square brackets.
a Significance at the 1% level.
b Significance at the 5% level.
c Significance at the 10% level.

In this stage we construct standard Granger-type causality tests augmented with a lagged error-correction term where the series are cointegrated. The equations where $TOUR_t$, $NTOUR_t$ and RER_t are dependent variables are estimated without an error-correction term because we failed to find evidence of cointegration for these equations. However, given that the bounds *F*-test suggest that [Y_t| $TOUR_t$, RER_t] and [Y_t| $NTOUR_t$, RER_t] are cointegrated when Y_t is the dependent variable, we augment the Granger-type causality test when Y_t is the dependent variables with a lagged error-correction term. Thus, the Granger causality test involves specifying a multivariate *p*th order vector error correction models (VECM) as follows:

$$\begin{bmatrix} \Delta \ln Y_t \\ \Delta \ln TOUR_t \\ \Delta \ln RER_t \end{bmatrix} = \begin{bmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \upsilon_{11}\upsilon_{12}\upsilon_{13} \\ \upsilon_{21}\upsilon_{22}\upsilon_{23} \\ \upsilon_{31}\upsilon_{32}\upsilon_{33} \end{bmatrix} \begin{bmatrix} \Delta \ln Y_{t-i} \\ \Delta \ln TOUR_{t-i} \\ \Delta \ln RER_{t-i} \end{bmatrix} + \begin{bmatrix} \vartheta_1 \\ 0 \\ 0 \end{bmatrix} \left[ECT_{t-1}\right] + \begin{bmatrix} \psi_{1t} \\ \psi_{2t} \\ \psi_{3t} \end{bmatrix} \qquad (6)$$

$$\begin{bmatrix} \Delta \ln Y_t \\ \Delta \ln NTOUR_t \\ \Delta \ln RER_t \end{bmatrix} = \begin{bmatrix} \tau_1 \\ \tau_2 \\ \tau_3 \end{bmatrix} + \sum_{i=1}^{p} \begin{bmatrix} \rho_{11}\rho_{12}\rho_{13} \\ \rho_{21}\rho_{22}\rho_{23} \\ \rho_{31}\rho_{32}\rho_{33} \end{bmatrix} \begin{bmatrix} \Delta \ln Y_{t-i} \\ \Delta \ln NTOUR_{t-i} \\ \Delta \ln RER_{t-i} \end{bmatrix} + \begin{bmatrix} \phi_1 \\ 0 \\ 0 \end{bmatrix} \left[ECT_{t-1}\right] + \begin{bmatrix} \omega_{1t} \\ \omega_{2t} \\ \omega_{3t} \end{bmatrix} \qquad (7)$$

In addition to the variables defined above, Δ is the lag operator, ECT_{t-1} is the lagged error-correction term derived from the long-run cointegrating relationship (this term is not included if the variables are not cointegrated), and in Eq. (6) ψ_{1t}, ψ_{2t} and ψ_{3t} and in Eq. (7) ω_{1t}, ω_{2t} and ω_{3t} are serially independent random errors with mean zero and finite covariance matrix. In each case the dependent variable is regressed against the past values of itself and other variables. The optimal lag length *p* is based on the SBC. The existence of cointegrating relationships between the variables under consideration suggests that there must be Granger causality in at least one direction, but it does not indicate the direction of temporal causality between the variables. We examine both short-run and long-run Granger causality in a multivariate framework. The short-run causal effects can be obtained by the *F*-statistics of the lagged explanatory variables in each of the three equations both in Eqs. (6) and (7) where in the equation when real GDP is the dependent variable, the significant *t*-statistics on the coefficient of the lagged error-correction term indicates the existence of the long-run causal effect. Table 6 summarizes the results of the long-run and short-run Granger causality for Eq. (6) whereas Table 7 exhibits the Granger causality results for Eq. (7).

Table 6: Results of Granger Causality Tests for Eq. (6)

Dependent Variable	$\Delta\ln Y_t$	$\Delta\ln TOUR_t$	$\Delta\ln RER_t$	ECT_{t-1} [*t*-stat.]
$\Delta\ln Y_t$	—	2.4251 [.075]	0.0589 [.809]	-0.7557* [-8.7448]
$\Delta\ln TOUR_t$	2.3427 [.062]	—	1.8130 [.155]	—
$\Delta\ln RER_t$	1.7009 [.177]	0.1928 [.901]	—	—

Notes: Critical value of *t*-test is 2.000 at the 5% significance level. Critical value of *F*-statistics is 5.69 and 3.79 at the 5% and 10% significance levels, respectively. Probability values are in brackets. *t*-statistics of ECT_{t-1} is in square bracket. * Significance at the 1% level.

Table 7: Results of Granger Causality Tests for Eq. (7)

Dependent Variable	$\Delta\ln Y_t$	$\Delta\ln NTOUR_t$	$\Delta\ln RER_t$	ECT_{t-1} [*t*-stat.]
$\Delta\ln Y_t$	—	2.2055 [.079]	1.2754 [.290]	-0.5864* [-4.7423]
$\Delta\ln NTOUR_t$	3.6709 [.008]	—	1.1886 [.322]	—
$\Delta\ln RER_t$	0.1175 [.976]	0.7217 [.580]	—	—

Notes: Critical value of *t*-test is 2.042 at the 5% significance level. Critical value of *F*-statistics is 5.69 and 3.79 at the 5% and 10% significance levels, respectively. Probability values are in brackets. *t*-statistics of ECT_{t-1} is in square bracket. * Significance at the 1% level.

Beginning with the results for the long-run, as can be seen from Table 6 and 7, the coefficients on the lagged error-correction terms are significant with the expected sign and plausible magnitude in the real GDP equations at 1% significance level. This confirms the result of the bounds test for cointegration. In the long run both the international tourist expenditures and real exchange rates Granger-cause real GDP, meaning that causality runs interactively through the error-correction term from tourist expenditures and real exchange rates to real GDP. The coefficient on the lagged error correction term (-0.75) measures the speed of adjustment to obtain equilibrium in the event of shock(s) to the system. The result suggests that changes in real GDP are a function of disequilibrium in the cointegrating relationship and implies that the series is non-explosive and that long-run equilibrium is attainable. Because the ECT_{t-1} measures the speed at which the endogenous variable adjusts to changes in the explanatory variables before converging to its equilibrium level, the coefficient of -0.96 suggests that convergence to equilibrium after a shock to real GDP in Turkey takes about one year. Similarly, the international tourist arrivals and the real exchange rates Granger-cause real GDP through the error correction term, suggesting 55 percent of the disequilibria of the previous period's shock adjust back to the long run equilibrium in the current year. Thus, in both of the equations, the speed of adjustment is considerably fast in the case of any stochastic shock to the real GDP. As to the short-run results, the *F*-statistics on none of the lagged differences of the explanatory variables are significant, indicating little evidence of any short-run causality, this is not surprising given the usual assumption that economic growth interacts with other macroeconomic factors in the long run rather than in the short run. Overall, the causality results suggest that there is a uni-directional causality running from real exchange rates and international tourist expenditures and international tourist arrivals to real GDP in the long-run.

4. CONCLUSIONS

Since the outset of the 1980s, as part of the export-led economic growth strategy, tourism industry has been subsidized intensively in Turkey. International tourism receipts have been regarded as a major source of foreign exchange earnings for Turkey that was confronted by foreign exchange constraints during the late 1970s. Therefore, promoting tourism industry in Turkey has become a primary development strategy because tourism receipts together with export revenues that well compensate current account deficits. Tourism is an important industry for Turkey. The relative weight of tourism industry in the Turkish economy suffices to analyze the relationship between tourism and economic growth. We make use of two different indicators as proxies for the volume of international tourism, namely the international tourist expenditures and the total number of foreign visitors accommodating in Turkey. This paper has investigated the nature of the relationship between economic growth, the international tourism and the real exchange rates, finding evidence to support long-run uni-directional causality running interactively through the error correction term from international tourism and real exchange rates to real product, but not *vice versa*. The results indicate that the tourism-led growth hypothesis applies to the Turkish economy suggesting that tourism is an important determinant of overall long-run economic growth. Evidently, both the international tourist arrivals and the international tourist expenditures positively impact economic growth in Turkey. The results indicate that in the long-run economic growth in Turkey is strongly influenced from the tourism-expansion policies of the respective governments. A policy implication to be drawn from this paper is that Turkey can improve its economic growth performance by strategically harnessing the contribution of the tourism industry. Since tourism is an important engine of economic growth, it is necessary to increase international tourism in order to stimulate national development caused by such activity.

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