The tourism-led growth hypothesis: empirical evidence from Turkey

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ABSTRACT

In the economic growth literature, the contribution of tourism to economic development has attracted great attention due to its significant roles as a source of foreign exchange earnings, creation of employment opportunities and an important source of public revenues in many countries. In this paper, we aim to analyse the empirical relationship between economic growth and tourism by employing different econometric techniques. First, we employed the Bound test approach developed by Pesaran, Shin, and Smith (2001, Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326) in order to investigate the co-integration relationship between economic growth and tourism. Second, we used the Granger causality analysis for the 1998–2011 period and found evidence of a long-run unidirectional causality running from tourism to economic growth, but not vice versa. Our findings show that the Turkish case supports the tourism-led growth hypothesis (TLGH). Third, the autoregressive-distributed lag approach was employed in order to investigate the long-term and short-term static relationship between tourism and economic growth. The results show that tourism has a positive effect on gross domestic product and economic growth both in the long-term and short-term. Finally, the effect of tourism on economic growth was also investigated dynamically by employing the Kalman filter method. The findings of this method support the TLGH for Turkey.

Keywords: tourism; granger causality; ARDL model; Kalman filter method

1. Introduction

Tourism is generally viewed as one of the most rapidly growing industries in the world. It can help promoting economic growth by creating jobs, generating income, diversifying the economy, attracting foreign investment and promoting the transfer of technology and information. In recent years, it has gradually become an important channel of finance and a contributor to foreign exchange earnings for many countries. According to the World Tourism Organization (WTO, 2008), international tourism ranked as the fourth largest industry in the world, after fuels, chemicals and automotive products. For this reason, many developing countries are keenly supporting economic policies to promote international tourism since they perceive the tourism sector as one of the key areas with potential resources to contribute to their development. Moreover, they are also adopting new policies to improve their own tourism strategy to accelerate economic development

Developing countries have tried to implement policies to set up the necessary infrastructure for tourism and investing in human capital to expand the tourism sector. Tourism is one of the principal sectors for 83% of developing countries and for one-third of them, it is the leading export sector (WTO, 2002, p. 9). Therefore, many developing countries try to leverage this sector by providing fiscal incentives, tax exemptions and sector-specific levies. Tourism is recognised as having a positive effect on economic growth through different channels. First, tourism creates inflows of foreign exchange or constitutes an important source of financial resources for the host country, which can be used in investments in capital goods, thereby increasing production. Second, tourism plays an important role in stimulating investments in new infrastructure and competition. Third, tourism stimulates other economic industries by direct, indirect and induced effects. Fourth, tourism generates employment and increases income. Fifth, tourism causes positive economics of scale. Finally, tourism is an important factor in the diffusion of technical knowledge, stimulation of research and development and accumulation of human capital (Brida, Carrera, & Risso, 2008, p. 14). The argument that tourism can promote and contribute to long-run growth through varied channels is known in the literature as the tourism-led growth hypothesis (TLGH) (Shan & Wilson, 2001). Accordingly, tourism provides foreign exchange, which can be used to import capital goods in order to produce goods and services, which in turn lead to economic growth (Mckinnon, 1964). In this way, the TLGH poses that a country's economic growth must benefit from the income provided from the tourism activity (Balaguer & Cantavella-Jorda, 2002). International tourism can be considered as either a non-traditional export, which implies a source of receipts, or as a potential strategic factor to development and economic growth (Chang, Khamkaew, & McAleer, 2010, p. 4). In their empirical studies, McKinnon (1964), Gray (1970), Lea (1988), Hazari and Kaur (1995), Hazari and Sgro (1995), Brohman (1996) and Clancy (1999) suggest that development in tourism has an important impact on employment, foreign currency and government income. Since the study of Shan and Wilson (2001), there have been several empirical papers analysing the tourism industry's contribution to country's economic growth by performing the Granger causality test (for example, Balaguer & Cantavella-Jorda, 2002; Dristakis, 2004; Kim, Chen, & Jang, 2006; Oh, 2005), panel data (for example, Brau, Liberto, & Pigliaru, 2011; Eugenio-Martı´n, Morales, & Scarpa, 2004; Lee & Chang, 2008), the bound test (for example, Katircioglu, 2009; Narayan, 2004) and Johansen approach for co-integration (for example, Aslan, 2008; Brida et al., 2008; Kim et al., 2006). Several empirical studies were also conducted for Turkey analysing tourism's contribution to the country's economic growth. Ongan and Demiro¨z (2005) found results suggesting a bi-directional causality between international tourism and economic growth for Turkey. Bahar (2006) identified the existence of a long term and reciprocal relationship between economic growth and the tourism variable for Turkey. Yıldırım and O¨ cal (2004), Gu¨ndu¨z and Hatemi (2005), Aslan (2008), Zortuk (2009) and Arslantu¨rk and Atan (2012) also found evidence suggesting the existence of a uni-directional causality running from tourism towards growth. Katircioglu (2009) did not find co-integration by employing the Bound test and Johansen approach for the Turkish economy. He also found no empirical support for the TLGH for the Turkish economy. Since the beginning of liberalisation in the early 1980s, the Turkish economy witnessed an unprecedented period of economic growth and increasing competition. Simultaneously, trade liberalisation created an environment conducive to providing a stimulus to export and the transformation of sectors in the economy. This process has been accompanied by unique structural changes especially in the tourism sector that makes the country an interesting case study for assessing the TLGH.

The purpose of this paper is to investigate possible causal relationships among tourist arrivals, real effective exchange rate (RER) and economic growth measured by real gross domestic product (GDP) through the application of different econometric techniques. In this paper, we employed four econometric models to investigate the TLGH. First, we examined the co-integration relationship between the variables by employing the Bound test approach proposed by Pesaran, Shin, and Smith (2001). Second, we examined the causality relationship between economic growth and tourism employing the Granger causality test. Then, the autoregressive-distributed lag (ARDL) approach was employed to explore the long- and short-term static relationship between tourism and economic growth. Finally, we investigated the dynamic relationship between tourism and economic growth by employing the Kalman filter analysis in our sample period. The originality of this study is to test the validity of the TLGH in Turkey by employing the Kalman filter method for the first time. In the case of parameter instability, the Kalman filter approach is a better approach than co-integration, causality and ARDL models methods since it allows one to estimate time varying coefficients. Before performing the Kalman filter analysis, however, standard models must be performed to ensure a welldefined relationship among the variables in the TLGH model. The paper is organised as follows: Section II investigates Turkey's tourism performance; Section III introduces data and methodology. Section IV presents empirical results and Section V concludes.

2. Turkey's tourism performance

Tourism in Turkey is a large and fast growing sector mainly because of two reasons. First, Turkey is a country constituting a 'bridge between two cultures', east and west, and attracting tourists from both cultures. Second, it has very special large coastal resort areas attracting torurists with particular interest in those areas. With the liberalisation process of the 1980s, the growth of travel facilities and tourism industry in Turkey has been largely accelerated. The Tourism Encouragement Law (No. 2634), enacted in 1982, provided a strong momentum for the industry's growth, which made Turkey a very popular destination, especially for tourists from Western Europe.

Tourist arrivals were only 5.39 millions in 1990. It increased to 7.10 million in 1992 and decreased sharply in 1993 to 6.52 millions due to the Gulf War, the Asian Crisis and some terrorist attacks in Turkey. Since then, however, government subsidies and the positive global economic outlook have changed the trend of the tourism industry. The tourism sector continues to grow in spite of the financial crises in Turkey in 1999, 2000 and 2001 (Figure 1).

The tourism sector gained further momentum with the enactment of Law No. 4848 aiming to support the tourism sector by giving priority to the policies such as competitiveness, customer satisfaction and sustainable tourism planning. The positive effect of the law and growth performance between 2002 and 2008 could be observed by looking at the increase in foreign tourist arrivals from 13.24 million to 26.3 million between 2002 and 2008. In 2009, the year of global crisis, the number of tourist arrivals continued to increase, though at a slower rate. The increase in that year fell below 10%. Parallel to the increase in the number of tourist arrivals, tourism revenues have also increased significantly in Turkey over the years. It was US$ 326 million in 1980 and increased to US$ 7.63 billion in 2000. However, similar to the international tourism trends, the global financial crisis has also affected the tourism sector negatively in Turkey. In 2008, tourism revenues were US$ 21.9 billion. The following year tourism revenue declined to US$ 21.2 billion and to US$ 20.8 in 2010 due to decreasing global demand. In 2011, the number of tourist arrivals reached 31 million and tourism revenues were US$ 23.02 billions (in the last three months). Turkey's share in the European tourism market is 5.6% in terms of tourist arrivals. Turkey is the seventh destination among the top 20 most visited places in terms of tourist arrivals in the world. The following sections considers emprically the validity of the tourism-growth model in Turkey during the developments of tourism sector mentioned in Section II by applying both static and dynamic methods.

3. Data and methodology

This study uses quarterly real GDP, the volume of international tourist arrivals (T), and the RER covering the period 1998Q1 – 2011Q3. Real GDP is used in order to measure the value of economic growth, while tourism arrival is used as a measure of tourism activity (Wang & Godbey, 1994) and RER is used as a proxy variable of external competitiveness.

The real GDP series in 1998 constant 1000 Turkish Liras were obtained from The Turkish Statistical Institute. The 2003 ¼ 100-based RER series was obtained from Central Bank of Turkey, Electronic Data Delivery System. The number of international tourist arrivals was obtained from the Ministry of Tourism of Turkey. The GDP and tourism series are seasonally adjusted, employing the Tramo-Seats methodology and measured in natural logarithms similar to the empirical literature. Natural logarithms of GDP and T are denoted as LY and LT, respectively.

Co-integration, causality and ARDL models are mostly used in papers that investigate the TLGH. This study differentiates itself from existing works by employing the Kalman filter algorithm in order to account for time varying empirical link between the series employed. By doing so, the TLGH is analysed dynamically, different from existing literature. In empirical analysis, first we investigate stationarity of the series. Testing stationarity with conventional unit root tests does not consider the structural breaks. In order to solve Figure 1. Tourist arrivals and income in Turkey (1987 –2011). 636 H.M. Ertugrul and F. Mangir this problem, we employ both conventional unit root tests including augmented Dickey Fuller (ADF), Phillips –Perron (PP), Kwiatkowski –Phillips –Schmidt –Shin (KPSS) and Ng –Perron tests and unit root tests with structural breaks including Zıvot and Andrews (1992) tests and Lee and Strazicich (2003) tests.

Afterwards, determining the order of integration for all series, we investigate the existence of the long-term co-integration relationship between variables employing the Bound Test developed by Pesaran et al. (2001). The Bound test approach has some advantages over conventional co-integration models. First, the Bound test approach can be employed irrespective of whether the regressors are purely I(0) or I(1) (Pesaran et al., 2001). Second, the Bound test co-integration approach has superior properties in small sample sizes over other co-integration approaches (Narayan & Narayan, 2004).

Engle and Granger (1987) suggest that if co-integration exists between the variables in the long run, then there must be either a uni- or bi-directional Granger causality between these variables, although this may not be uncovered using a finite sample (Soytas, Sarı, & Ozdemir, 2001). Therefore, after the co-integration analysis, we investigate the causal relationship between tourism and economic growth by employing Granger causality tests and then, we investigate the short- and long-term static relationship between the variables by using an ARDL model.

Finally, we followed a dynamic approach by using the Kalman filter to depict the time varying interaction between tourism and economic growth. In time varying parameter (TVP) models, the parameters are allowed to change with each new observation (Koop & Potter, 2007).

4. Results

4.1. Unit root tests

First, we investigate the stationarity characteristics of the series. In this respect, we employ both conventional unit root tests including Dickey and Fuller (1979), Phillips and Perron (1988), Kwiatkowski, Phillips, Schmidt, and Shin (1992) and Ng and Perron (2001) tests and unit root tests with structural breaks including Zıvot and Andrews (1992) test with one break and Lee and Strazicich (2003) tests with two breaks. The results of conventional stationary tests are given in Table 1:

According to Table 1:

- For the ADF and PP tests, the null hypothesis suggests that the series include unit root. The calculated 't'-statistics for all variables (LY, LT and RER) are less than the critical values in their level forms for ADF test. Thus, the null hypothesis cannot be rejected, suggesting that all variables are non-stationary in their level forms. The results of the first differenced variables show that ADF test statistics for all variables are greater than critical values at 1% level. Moreover, all variables are stationary after differenced, suggesting that all variables are integrated of order I(1), according to ADF test. For PP test, the calculated t-statistics for LY and LT are less than the critical values in their level forms and the results of the first differenced LY and LT variables are greater than critical values at 1% level. The PP test results suggest that LY and LT series are I(1). However, the calculated 't'-statistics for RER is greater than critical values at 5% level, so PP test implies RER is stationary in level forms.

Table 1: Conventional Unit Root Test Results

ADF Test Results			
LY	-2.451	ΔLY	-5.293*
LT	-3.045	ΔLT	-5.939*
RER	-3.071	ΔRER	-7.647*
ADF critical values for LY, LT and RER %1=-4.137 and %5=-3.495		ADF critical values for ΔLY, ΔLT and ΔRER %1=-2.609 %5=-1.947	

PP Test Results			
LY	-2.474	ΔLY	-5.329*
LT	-3.266	ΔLT	-5.831*
RER	-3.496**		
PP critical values for LY, LT and RER %1=-4.137 and %5=-3.495.		PP critical values for ΔLY and ΔLT %1= -2.609 %5=-1.947	

KPSS Test Results			
LY	0.850	ΔLY	0.137*
LT	0.856	ΔLT	0.096*
RER	0.186*		
KPSS critical values for LY, LT and RER %1=0.739 and %5=0.463		KPSS critical values for ΔLY and ΔLT %1= 0.739 %5=0.463	

Ng-Perron Test Results				
	MZ_a	MZ_t	MSB	MPT
LY	-8.259	-2.019	0.244	11.073
LT	-10.859	-2.318	0.213	8.450
RER	-25.818	-3.648	0.137	3.721
ΔLY	-20.147	-3.173	0.157	1.220
ΔLT	-25.175	-3.542	0.140	0.990

Ng-Peron critical values for LY,LY and RER series; MZa, MZt, MSB, MPT respectively;
%1 significance level -23.80, -3.42, 0.14 and 4.03
%5 significance level for -17.30, -2.91, 0.17 and 5.48.

Ng-Peron critical values for ΔLY and ΔLT series; MZa, MZt, MSB, MPT respectively;
%1 significance level -13.80, -2.58, 0.17 and 1.78
%5 significance level for -8.10, -1.98, 0.23 and 3.17

* denote %1 significance level

** denote %5 significance level

- For the KPSS test, the null hypothesis shows that the investigated series are stationary. The calculated 't'-statistics for LY and LT are greater than the critical values in their level forms and the results of the first differenced LY and LT variables are less than critical values at 1% level. The KPSS test results suggest that LY and LT series are I(1). However, the calculated 't'-statistics for RER is less than critical values at 1% level. Thus, the null hypothesis of stationarity cannot be rejected, suggesting RER is I(0).
- For the Ng –Perron test, according to the MZa and MZt tests, the null hypothesis shows that the series have a unit root, and according to the MSB and MPT tests, the null hypothesis shows that the series are stationary. For the MZa and MZt tests, the calculated 't'-statistics LY and LT are less, and for MSB and MPT tests, the calculated 't'-statistics for LY and LT are greater than the critical values suggesting that LY and LT are non-stationary in their level forms. For the first difference of series, according to MZa and MZt tests, the calculated 't'-statistics for LY and LT are greater, and for MSB and MPT tests, the calculated 't'-statistics for LY and LT are less than the critical values at 1% level, suggesting that LY and LT become stationary after differencing so that LY and LT series are I(1) according to Ng –Perron tests. However, the calculated 't'-statistics for RER is greater according to MZa and MZt tests and is less according to MSB and MPT tests, suggesting that RER is stationary in the level form.

The results of unit root tests with structural breaks are given in Table 2:

- According to both the Zıvot and Andrews (1992) and the Lee and Strazicich (2003) tests, the null hypothesis shows that the series have a unit root. For the Zıvot and Andrews (1992) and the Lee and Strazicich (2003) tests, the calculated 't'-statistics for LY and LT variables are less than the critical values in their level forms and greater than the critical values in their first difference at 5% significance level. Moreover, both the Zıvot and Andrews (1992) and the Lee and Strazicich (2003) tests suggest that LY and LT variables become stationary after differencing. However, the calculated t-statistics for RER is greater than critical values at 5% level. Thus, the null hypothesis of unit root can be rejected, suggesting RER is I(0).

Both conventional unit root tests and unit root tests with structural breaks show that LY and LT series are stationary after differencing, so that LY and LT series are I(1). And both conventional unit root tests except ADF and unit root tests with structural breaks show that RER is stationary in level form so that RER is I(0).

Afterwards, determining the order of integration for all series, we investigate the existence of the long-term co-integration relationship between variables employing the Bound test developed by Pesaran et al. (2001). The Bound test approach has some advantages over the conventional co-integration models. First, The Bounds test approach can be employed irrespective of whether the regressors are purely I(0) or I(1) (Pesaran et al., 2001). Second, the Bound test co-integration approach has superior properties in small sample sizes than other co-integration approaches (Narayan & Narayan, 2004).

Table 2: Unit Root Tests with Structural Breaks

Zivot-Andrews (1992) Test				
	Level		First Difference	
	Model A	Model C	Model A	Model C
LY	-3.04	-2.85	-5.44*	-5.93*
LT	-4.27	-4.80	-5.79*	-5.81*
RER	-5.63*	-5.76*		
Critical Val (%5)	-4.80	-5.08	-4.80	-5.08
Lee-Strazitch (2003) Test				
	Level		First Difference	
	Model A	Model C	Model A	Model C
LY	-2.42	-5.17	-5.56*	-6.17*
LT	-2.63	-5.04	-6.06*	-8.88*
RER	-4.33*	-6.20*		
Critical Val (%5)	-3.84	-5.71	-3.84	-5.71

∗Significant at 5% level.

4.2. Bound test co-integration approach

After investigating the stationarity of the series, we investigate the co-integration relationship between tourism, RER and GDP by employing the Bound test approach developed by Pesaran et al. (2001). For the Bound test analysis, we first formed the Unrestricted Error Correction Model (UECM). The UECM specification for our study is given in the following equation.

$$\Delta LY_t = \alpha_0 + a_1 t + \sum_{i=1}^{m} \alpha_{2,i} \Delta LY_{t-i} + \sum_{i=0}^{m} \alpha_{3,i} \Delta LT_{t-i} + \sum_{i=0}^{m} \alpha_{4,i} \Delta RER_{t-i} + \alpha_5 LY_{t-1} + \alpha_6 LT_{t-1} + \alpha_7 RER_{t-1} + \mu_t \quad (1)$$

where LY is the log of real GDP, LT is the log of the volume of international tourist arrivals and RER is the real effective exchange rate. In the UECM model in Equation (1), ‘m’ represents number of lags and ‘t’ represents trend variables.

For testing the existence of a co-integration relationship, the statistic underlying the procedure is the Wald or F-statistic in a generalised Dickey –Fuller type regression, which is used to test the significance of lagged levels of the variables under consideration in a conditional UECM (Narayan & Narayan, 2004).

Null hypothesis for F-test is established as $H_0 = a_5 = a_6 = a_7 = 0$ for our study and calculated F-statistics is compared with the table below and upper critical levels in Pesaran et al. (2001). If the computed F-statistic falls outside the critical bounds, a conclusive decision can be made regarding co-integration without knowing the order of integration of the regressors. For instance, if the empirical analysis shows that the estimated F-statistics is higher than the upper bound of the critical values, then the null hypothesis of no co-integration is rejected. If the estimated F-statistics is lower than the bottom bound of critical values, there is no co-integration relationship between the series (Narayan & Narayan, 2004). If the calculated F-statistics is between the bottom and upper critical values, no exact opinion can be made (Karagol, Erbaykal, & Ertugrul, 2007).

Maximum lag number for the UECM model is taken as 8, and according to Schwarz criteria, the lag number is found to be 1.1 After determining the lag number of the UECM model, we investigate the co-integration relationship. We compared the computed F-statistic from the UECM model with table bottom and upper critical levels in Pesaran et al. (2001). Table 3 gives the bound test results.

According to Table 3, F-statistics is higher than the upper bound of the critical values, and the null hypothesis of no co-integration is rejected. As a result, we found a significant long-run co-integration relationship between GDP, tourism and RER by employing the Bound test analysis. Then we found the co-integration relationship and we investigated the direction of the causality by employing the Granger causality test. The reason for this is that, if there is a co-integration relationship between the variables (in our study among tourism, GDP and RER), this suggests that there must be a Granger causality in at least one direction according to Engle and Granger (1987).

Table 3. Bound Test Results

K	**F statistics**	**Critical Value at %5 Significance Level**	
		Bottom Bound	Upper Bound
2	6.47	4.87	5.85

k is number of independent variable number in equation 1. Critical values are taken from Table C1.v at Pesaran et. al. (2001:300)

4.3. Granger causality test

After we found a co-integration between tourism and GDP, we investigated the causality relationship. In order to investigate the Granger causality, we estimate the Error Correction Model (ECM). The Granger causality model specification for our study is given in the following equations:

$$\Delta LY = a_1 + \sum_{i=1}^{n} a_{2i}\,\Delta LT_{t-i} + \sum_{i=1}^{n} a_{3i}\,\Delta RER_{t-i} + \sum_{i=1}^{n} a_{4i}\,\Delta LY_{t-i} + \delta\, ECT_{t-i} + \varepsilon_{yt} \qquad (2)$$

$$\Delta LT = \beta_1 + \sum_{i=1}^{n} \beta_{2i}\,\Delta LY_{t-i} + \sum_{i=1}^{n} \beta_{3i}\,\Delta RER_{t-i} + \sum_{i=1}^{n} \beta_{4i}\,\Delta LT_{t-i} + \gamma\, ECT_{t-i} + \varepsilon_{yt} \qquad (3)$$

where LY is the log of real GDP, LT is the log of the volume of international tourist arrivals and RER is the real effective exchange rate.

The existences of co-integration relationship among tourism, GDP and RER suggest that there must be Granger causality in at least one direction. In addition to providing an indication of the direction causality, the ECM enables us to distinguish between ‘shortrun’ and ‘long-run’ Granger causality (Asafu-Adjaye, 2000).

Joint F-statistics of the lagged explanatory variables give an indication of the significance of short-run causal effects. In order to investigate the short-run causality, we will test for all a_{2i} equals 0 in Equation (2) or for all β_{2i} equals 0 in Equation (3). Asafu Adjaye (2000) interpreted the short-run causality as the weak Granger causality in the sense that the dependent variable responds only to short-term shocks in stochastic environment (Karagol et al., 2007).

For long-run causality, joint F-statistics for the interactive terms (i.e. the error correction term (ECTs) and the explanatory variables) is tested, which give an indication of which variables bear the burden of short-run adjustment to re-establish long-run equilibrium (Asafu-Adjaye, 2000). In order to investigate long-run causality, we will test the joint hypotheses that all a_{2i} and δ are jointly 0 in Equation (2) or all β_{2i} and γ are jointly 0 in Equation (3). Long-run causality is referred as a strong Granger causality test. Table 4 gives Granger causality test results:

According to Table 4, there is a uni-directional short- and long-run causal relationship from tourism to GDP. These results support the TLGH for Turkey.

After the causality analysis, we investigate the long- and short-run static relationship between the variables employing the ARDL model.

Table 4. Granger Causality Tests

Dependent Variable	Source of Causation (Independent Variable)			
	Short Run-Causality		Long Run-Causality	
	ΔLY	ΔLT	ECT/ ΔLY	ECT / ΔLT
ΔLY	------	3.33**	------	3.73*
ΔLT	0.479	------	2.043	------

Note:The appropriate lag lengths are chosen using Schwarz's Information Criteria (AIC).
* Denotes for 5% significance level.
** Denotes for 10% significance level.

4.4. ARDL model

The ARDL model specification for our study is given in the following equation:

$$LY_t = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} LY_{t-i} + \sum_{i=0}^{n} \alpha_{2i} LT_{t-i} + \sum_{i=0}^{p} \alpha_{3i} RER_{t-i} + \mu_t \qquad (4)$$

In order to determine the optimal lag length in Equation (4), a maximum lag number of 8 is taken and the ARDL (1,0,0) model is selected, employing the Schwarz information criterion. The estimated long- and short-term coefficients using the ARDL (1,0,0) model are given in Table 5. According to diagnostic checks, error terms in the ARDL model are normally distributed and there are no serial correlation, heteroscedasticity and misspecification problems in the model.

According to long-term coefficients obtained from the ARDL (1,0,0) model, all dependent variables are statistically significant. The long-term coefficient of tourism is estimated as 0.237. The long-run coefficient estimates suggest that a 1% increase in tourism will lead to a 0.237% increase in GDP.

Table 5. ARDL (1,0,0) Model Long and Short Term Parameter Estimations

Estimated Long Term Coefficients Using ARDL(1,0,0) Model		
Variables	Coefficient	T statistics
LT	0.237	3.396*
REK	0.006	2.758*
C	19.578	21.896*
Error Correction Representation for the ARDL(1,0,0) Model		
Variables	Coefficient	T statistics
DLT	0.046	2.082**
DREK	0.001	2.738*
C	3.812	3.194*
ECT(1)	-0.194	-3.143*
Diagnostic Checks		
X^2_{BG} (A)	5.828 [0.212]	
χ^2_{NORM} (B)	3.975 [0.137]	

χ^2_{WHITE} (C)	0.426[0.513]
X^2_{RAMSEY} (D)	0.499[0.480]

*denotes %1 significance level, ** denotes %5 significance level

(A) Lagrange multiplier test of residual serial correlation, (B) Based on a test of skewness and kurtosis of residuals (C) Based on the regression of squared residuals on squared fitted values, (D) Ramsey's RESET test using the square of the fitted values.

The short-run coefficient indicates a relationship between tourism growth and GDP growth. According to short-term results obtained from the ARDL (1,0,0) model, the coefficient of tourism growth on GDP growth is estimated as 0.046. It implies that a 1 point increase in tourism growth will lead to a 0.046 point increase in GDP growth in the short run.

The ECT(-1), is the one-period lagged value of error terms obtained from the equilibrium relationship. The coefficient of ECT(-1) shows the eliminated rate of the short-run disequilibrium in the long run. The ECT coefficient is estimated to be – 0.19. This means that approximately 19% of disequilibrium from the previous year's shock was eleminated in the current year.

Lastly, we investigate the same relationship dynamically, employing the Kalman filter model for the first time in the literature. Time varying interaction is important for several reasons. All literature about the TLGH employs static models such as the ARDL, co-integration or causality. These models only indicate the relationships between the variables in the sample period on average. So, in our paper, we employed the dynamic Kalman filter model and we investigated the TLGH for Turkey dynamically. By doing so, we could observe the changes in the relationship in our sample period. This is important for policy-makers to see how the tourism –GDP relationship changes over time. We could also observe the effects of the global financial crises periods on the tourism and GDP relationship in our sample.

4.5. Dynamic approach

We base our dynamic apporach on a classical reference of Harvey (1989) that introduces the Kalman filter approach. The Kalman filter approach (1960) is based on a form of state-space representation. A linear state-space of the dynamics of an equation can be represented as follows:

$$y_t = c_t + Z_t \alpha_t + \varepsilon_t \qquad (5)$$

$$\alpha_{t+1} = d_t + T_t \alpha_t + v_t \qquad (6)$$

where in our case α_t is a $2x1$ vector of unobserved state variables, where, c_t, Z_t, d_t and T_t are adaptable vectors and matrices, and where ε_t and v_t are vectors of mean zero, Gaussian disturbances. As stated in equation (6), unobserved state vector α_t is assumed to change over time as a first-order vector auto-regression. The Kalman filter recursively estimates the parameters by updating the estimation with every additional observation.

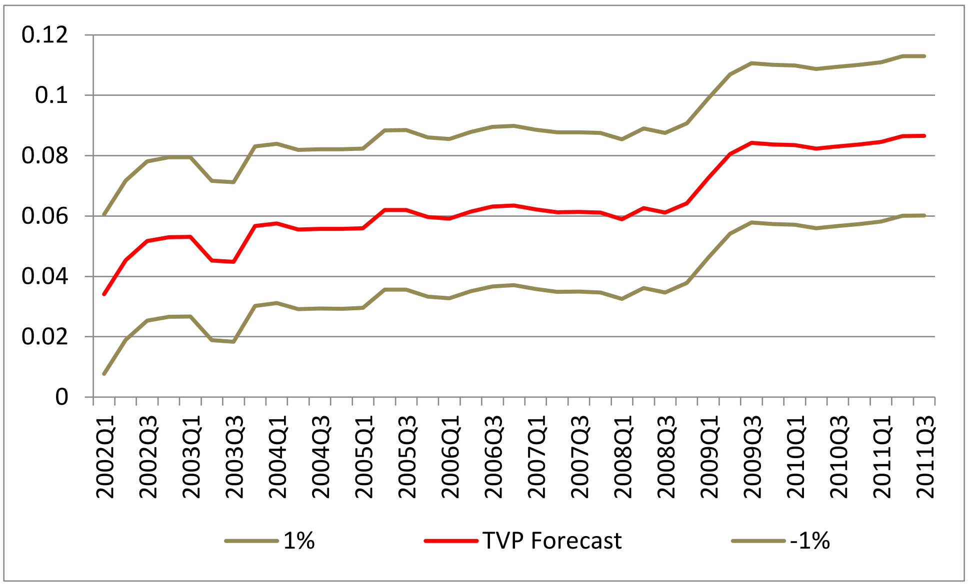
The Kalman filter specification used in our study is given in the following equations.

$$\Delta LY_t = a_0 + a_{1,t} \Delta LT_t + a_{2,t} RER_t + \varepsilon_t \qquad (7)$$

$$a_{i,t} = a_{i,t-1} + v_{i,t} \qquad (8)$$

The TVP estimates for tourism by employing Kalman Filter approach in 2002Q1– 2011Q3 period are shown in Figure 2.

Figure 2: Parameter Estimates for Kalman Filter Approach (2002 – 2011)



The parameter estimates for all variables are also statistically significant. The results show that tourism growth has a positive and increasing effect on GDP growth. The effect of tourism growth on GDP growth increased between 2002 and 2005 except the first half of 2003 and is almost stable between 2005 and 2008. During the crisis of 2007/2008, tourism sector showed steady growth. After the last quarter of 2008, the effect of tourism growth on GDP growth increased significantly and the effect still continues to rise.

5. Conclusions

The aim of this paper is to investigate the TLGH for Turkey for the 1998:Q1 – 2011:Q3 period by employing four different econometric models. Granger causality and Bound Test results support the TLGH for Turkey. Our results are different from Katircioglu (2009), who did not find co-integration by employing the Bound test and Johansen approach for the Turkish economy by using annual data from 1960 to 2006. We think the reasons why our results are different from Katirciog˘lu is because the time periods of the two studies were different, whereas Katircoglu's study analysed this for a period covering almost 50 years when Turkey's tourism passed through different cycles and development stages, our study focuses on a 14-year period which was characterised by particular policies aiming at instigating growth of the tourism sector. Turkey adopted outwardoriented trade strategies in 1980s. Moreover, full convertibility of the Turkish lira was realised and residents in Turkey were allowed to buy and transfer foreign currency holdings in 1989. These policies have accelereated the impact of tourism sector on economic growth in Turkey. Since then, the reform process has continued in Turkey to accelerate the tourism development. This is a crucially important finding as it indicates that policies have an impact on tourism and consequently on economic growth.

Finally, we employed the Kalman filter approach to investigate the dynamic relationship between tourism and economic growth. This study differentiates itself from existing works by employing the Kalman filter algorithm in order to account for the time varying empirical link between the series employed. By doing so, TLGH is analysed dynamically different from the literature. To our knowledge, this is the first paper that employs a Kalman filter model in order to investigate the TLGH for Turkey in existing emprical studies. The Kalman filter result indicates that tourism growth has a positive and increasing effect on the GDP growth.

Our results when compared with the findings in other countries are very essential for Turkey. The results support the TLGH, therefore a positive contribution of tourism to GDP growth in Turkey. Since it has run a current account deficit over the past decade persistently, promoting tourism sector to maximise the volume of international tourist arrivals and foreign exchange receipts should be focused to reduce the size of the current account deficit. Therefore, policy-makers need to be aware of the effects of tourism policy on economic growth and to consider how to add new policies in order to establish long lasting tourism policies to support sustainable GDP growth in Turkey.

Note:

1. Serial correlation for the UECM model investigated by employing Breusch–Godfrey serial correlation Lagrange multiplier (LM) test and no serial correlation found in the UECM model. Test results can be taken from the authors.

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