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A REEXAMINATION OF THE TOURISM-LED GROWTH HYPOTHESIS UNDER GROWTH AND TOURISM UNCERTAINTIES IN TURKEY

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ABSTRACT

As a part of international trade, tourism is considered as an important source of economic growth, especially for developing countries. Tourism is one of the major sources of export for the Turkish economy since the early 1980s. In this study, the tourism-led growth hypothesis has been tested for Turkey over the period 1992:Q1 - 2014Q1, employing structural break unit root tests, cointegration analysis and VECM based Granger causality analysis, including the growth and tourism uncertainties derived from GARCH models. Basic findings of the VECM Granger causality tests support the reciprocal causal hypothesis. Also, both the volatilities of tourism receipts and economic growth are Granger causes of tourism growth and economic growth in long-run as well as in short-run.

Keywords: *Tourism-led growth, uncertainty, causality, GARCH modeling, Turkey.*

JEL codes: L83, C32, F43, O49.

1. Introduction

The tourism industry has become an increasingly important boosting factor for the world economy as it has largely been indicated in many studies (Mishra, Rout & Mihapatra, 2011; Oh (2005); Mello-Sampayo & Souza-Vale, 2010). Generating foreign exchange earnings, the tourism industry also stimulates economic growth, creates employment opportunities, and contributes increases in investments (Tang & Abosedra, 2014; Katircioglu, 2009; Brida, Lanzilotta, Lionetti, & Risso, 2010; Eeckels, Filis & Leon 2012; Nowak, Sahli & Cortes-Jimenez 2007). Additionally, in many countries tourism receipts are important sources of balancing current account and balance of payments deficits (Oh, 2005; Mello-Sampayo and Souza-Vale, 2010). It is generally assumed that tourism expansion should have a positive effect on economic growth (Kim, Chen & Jang, 2006). The recognition of tourism as a service export industry accelerated the interest in theories considering export-led development strategies. However, in the recent years, there has been a great debate about the role of tourism in economic growth (Cortes-Jimenez & Pulina, 2009; Arslanturk, Balcilar & Ozdemir, 2011).

Tourism has emerged since the World War II and become one of the world's largest industries. The international tourist arrivals has grown from 25 million in 1950 to over 1 billion in 2013 (UNWTO, 2014). According to World Travel and Tourism Council (WTTC, 2014 a,b), direct contribution of tourism to global GDP was recorded as 2.15 trillion USD and regarding the indirect and induced effects, tourism's contribution was almost 7 trillion USD in 2013, generating 9.5% of the global GDP. Jobs created directly by the tourism industry is 101 million; furthermore when indirect and induced effects are taken into consideration the number increases to 265 million, 8.9% of jobs worldwide. In addition, tourism has stimulated 754.6 billion USD of investment (4.4%) and created 1.3 trillion (5.4%) of the total exports throughout the world. All these numbers can be considered as an evidence of tourism's role for the global economic growth (WTTC, 2014a).

The share of tourism receipts in GDP, exports and foreign trade deficit has grown rapidly since the declaration of the Tourism Incentive Law in 1982 in Turkey (Gunduz & Hatemi-J, 2005). Turkey has become one of the top tourism destinations in the world and tourism industry has become an indispensable source of income. Inbound tourist arrivals in Turkey was recorded as 37.8 million, corresponding to 32.3 billion USD of tourism receipts in 2013 (TUIK, 2014). WTTC (2014b) states that the direct contribution of tourism was approximately 32 billion USD (4.1% of GDP), and the total contribution was calculated as 71.1 billion USD in 2013. Tourism has created over 2.3 million jobs (9.1%) in 2013 with its overall contribution (direct, indirect and induced effects) to employment in Turkey.

The contribution of tourism to global and national economies has attracted many researchers starting with Oh (2005) to examine the interactions between tourism and economic growth, known as the tourism-led growth (TLG) hypothesis. According to Neoclassical growth theory, the expansion of exports could lead to output growth through spillover effects (Tang & Abosedra, 2014). TLG hypothesis is an extension of the export-led growth (ELG) hypothesis, where exports of tourism services are considered as an invisible commodity export potentially stimulating the economic growth (Kibara, Odhiambo & Njuguna, 2012). Regarding the ELG hypothesis, tourism is claimed to play an important role to achieve economic growth and this idea is supported by the United Nations World Tourism Organization (UNWTO) and WTTC (Cortes-Jimenez et al, 2009). Focusing on the interactions between foreign trade and economic growth, Oh (2005) introduced three hypotheses. These are; tourism-led economic growth (TLG) hypothesis, economic-driven tourism growth (EDTG) hypothesis, and reciprocal causal hypothesis. The tourism-led economic growth hypothesis states a unidirectional causal relationship from tourism expansion to economic growth. Economic-driven tourism growth hypothesis claims a unidirectional causal relationship from economic growth to tourism expansion. Finally, the reciprocal causal hypothesis argues that the relationship between tourism and economic growth is bidirectional (Chen & Chiou-Wei, 2009).

Oh (2005) suggests important variables that are critical determinants of tourism demand, such as exchange rates, should be taken into consideration in model specifications, in addition to a multivariate approach to improve the model performance. Chen & Chiou-Wei (2009)'s study concludes that the impact of uncertainty on both tourism and economic growth is evident, especially since uncertainties of both quantities lower the other's expansion capacity. Furthermore, incorporating the effects of uncertainty may provide information about the impact of profound shocks. Therefore it is assumed that an analysis of the TLG hypotheses should embrace these ideas and incorporate the effects of uncertainties as well as the exchange rates to represent the international prices and their effects on economic growth and tourism expansion. Consequently, the major contribution of this study is to advance the methodology by including the volatilities of economic growth and tourism receipts in addition to the exchange rates to see how economic growth and tourism receipts are affected by these variables.

The purpose of this paper is to investigate the short and long-run causal relationships between tourism expansion and economic growth along with the effects of tourism demand and economic growth volatilities. Therefore, section 2 introduces a brief review of literature. Section 3 summarizes the methodology of the study and section 4 interprets the major findings. Finally, the study concludes with policy implications for the Turkish tourism industry.

2. Literature Review

In Balaguer & Cantavella-Jorda (2002), literature on the subject is reviewed extensively, mostly focusing on the ELG hypothesis and the recent theoretical models on non-traded goods provide sufficient motivation for empirical analyses on the TLG hypothesis. Although there is wide array of studies testing the ELG hypothesis, there are few studies testing the TLG hypothesis, which are are limited in volume and diversity considering the selected countries or methods (Husein & Kara, 2011; Gunduz & Hatemi-J., 2005; Kreishan, 2011; Arslanturk et al, 2011).

Studies on the TLG hypothesis can be classified as single country and cross-country studies. Single country studies generally employ error correction models (ECM) or vector autoregression (VAR) analysis employing cointegration and causality analysis (i.e., Balaguer & Cantavella-Jorda, 2002; Brida, Pereyra, Riso, Devesa & Aguirre, 2009; Kim et al, 2006; Dritsakis, 2004; Durbarry, 2004; Oh, 2005; Singh, Wright, Hayle & Craigwell, 2010; Wickremasinge & Ihalanayake, 2006; Hye & Khan, 2013). There are a few studies such as Gunduz & Hatemi-J (2005), and Chen & Chiou-Wei (2009) using autoregressive conditional heteroskedasticity (ARCH/generalized ARCH) models, Durbarry (2004) employing Least Squares (LS) models, and Katırcıoğlu (2009a) using autoregressive distributed lag (ARDL) models. Cross country studies use methodologies including cointegration and static/dynamic panel data models (i.e., Akinboade & Braimoh, 2010; Brau, Lanza & Pigliaru, 2003; Eugenio-Martin & Morales, 2004; Fayissa, Nsiah & Tadesse, 2007; Proença & Souzakis, 2008; Skerritt & Huybers, 2005). Table 1 presents an extensive and detailed literature review on TLG hypothesis.

Table 1 TLG Hypothesis Literature Review

Author	Country	Period and Data Frequency	Empirical Methodology	Causal Relationship
Single Country				
Amaghionyeodiwe (2012)	Jamaica	1970-2005 Annual	Cointegration	TLG
Arslanturk et al. (2011)	Turkey	1963-2006 Annual	VECM	TLG
Aslan (2008)	Turkey	1992-2007 Quarterly	Cointegration	TLG
Bahar (2006)	Turkey	1963-2004 Annual	Causality	Reciprocal
Balaguer and Cantavella-Jorda (2002)	Spain	1975-1997 Quarterly	Cointegration	TLG
Belloumi (2010)	Tunisia	1970-2007 Annual	Cointegration	TLG
Brida et al. (2011)	Brazil	1965-2007 Annual	Cointegration	TLG
Brida et al. (2008)	Mexico	1980-2007 Quarterly	Cointegration/Causality	TLG
Brida et al. (2009)	Colombia	1907-2007 Quarterly	Cointegration	TLG
Brida et al. (2010)	Uruguay	1987-2006 Quarterly	Cointegration	TLG
Chen&Chiou-Wei (2009)	Taiwan and Korea	1975–2007 Quarterly	EGARCH and Cointegration	TLG for Taiwan Reciprocal for South Korea
Croes and Vanegas (2008)	Nicaragua	1980-2004 Annual	Causality	TLG
Dritsakis (2004)	Greece	1960-2000 Quarterly	ECM	Reciprocal
Durbarry (2004)	Mauritus	1952-1999 Annual	Cointegration	Reciprocal
Eeckels et al. (2012)	Greece	1976-2004 Annual	VAR	TLG
Georgantopoulos (2012)	Greece	1998-2011	VAR/VECM Analysis	Reciprocal
Gunduz and Hatemi-J (2005)	Turkey	1963-2002 Annual	Leveraged bootstrap causality	TLG
Husein and Kara (2011)	Turkey	1964-2006 Annual	Cointegration	TLG
Hye and Khan (2013)	Pakistan	1971-2008 Annual	Cointegration	TLG
Kasimati (2011)	Greece	1960-2010 Annual	ECM	None
Kırbas-Kasman ve Kasman (2004)	Turkey	1963-2002 Annual	VAR/Cointegration	TLG
Katırcıoğlu (2009a)	Turkey	1960-2006 Annual	Cointegration, ARDL	None
Katırcıoğlu (2009b)	Cyprus	1960-2005 Annual	Bounds Test/Causality	EDTG
Katırcıoğlu (2010)	Singapore	1960-2007 Annual	Bounds Test/Causality	TLG
Khalil et al. (2007)	Pakistan	1960-2005 Annual	ECM	Reciprocal
Kibara et al. (2012)	Kenya	1999-2010 Annual	ARDL-Bounds test	TLG
Kim et al. (2006)	Taiwan	1971-2003 Annual	Cointegration/Causality	Reciprocal
Kreishan (2011)	Jordan	1970-2009 Annual	Cointegration	TLG
Lean and Tang (2010)	Malaysia	1989-2009 Monthly	Causality	TLG
Lee and Chien (2009)	Taiwan	1959-2003 Annual	Unit root/Cointegration	TLG
Louca (2006)	Cyprus	1975-2001 Annual	Cointegration/Causality	Reciprocal
Mishra et al. (2011)	India	1978-2009 Annual	Causality	TLG
Norika and Mototsugu (2007)	Amami Islands, Japan	1976-2001 Annual	Distributed Lag/Partial Adjustment	TLG
Nowak et al. (2007)	Spain	1960-2003 Annual	Cointegration/Causality	Reciprocal
Odhiambo (2011)	Tanzania	1971-2006 Annual	ARDL-Bounds test	Reciprocal in short-run ELG in long-run
Oh (2005)	Korea	1975-2001 Quarterly	Causality and VAR	EDTG
Ongan and Demiroz (2005)	Turkey	1980-2004 Quarterly	Cointegration	Reciprocal

Payne and Mervar (2010)	Croatia	2001-2008 Quarterly	Causality	EDTG
Proença and Soukiasiz (2005)	Portugal	1993-2001 Annual	Panel estimation	TLG
Shan and Wilson (2001)	China	1987-1998 Monthly	VAR/Causality	Reciprocal
Tang and Abosedra (2014)	Lebanon	1995-2010 Annual	ECM	TLG
Wickremasinge and Ihalanayake (2006)	Sri Lanka	1960-2000 Annual	Causality	TLG
Yavuz (2006)	Turkey	1992-2004 Quarterly	Causality / Structural Break	None
Zortuk (2009)	Turkey	1990-2008 Quarterly	Causality	TLG
Cross Country				
Akinboade and Braimoh (2010)	South African Countries	1980-2005 Annual	Causality	TLG
Bahar and Bozkurt (2010)	21 Developing Countries	1998-2005 Annual	GMM	TLG
Brau et al. (2003)	143 Countries Including 14 Tourism Countries	1980-1995	OLS Regression	TLG
Brida and Giuliani (2012)	Italy and Austria 3 across-border regions	1980-2009 Annual	Cointegration/Causality	TLG for 2 regions
Chen and Chiou-Wei (2009)	Taiwan and South Korea	1975-2007 Quarterly	EGARCH-M	TLG for Taiwan Reciprocal for South Korea
Cortes-Jimenez and Pulina (2006)	Italy and Spain	1954-2000/1964-2000	Cointegration	EDTG
Eugenio-Martin et al. (2004)	21 Latin American Countries	1985-1998 Annual	Dynamic Panel	TLG for middle and low income countries None for high income countries
Fayissa et al. (2007)	42 African Countries	1995-2004 Annual	Static Panel	TLG
Fayissa et al. (2009)	17 Latin American Countries	1995-2004 Annual	Growth Model	TLG
Lee and Chang (2008)	32 OECD and Non-OECD countries	1990-2002 Quarterly	Panel Cointegration	TLG for OECD countries Reciprocal for non-OECD countries
Mello-Sampayo and Souza-Vale (2010)	27 European Countries	1988-2010 Annual	Cointegration/FMOLS	TLG for southern countries
Proença and Soukiasiz (2008)	4 Southern European Countries	1990-2004 Annual	Panel data techniques	TLG
Samimi et al. (2011)	20 Developing Countries	1995-2009 Annual	P-VAR	Reciprocal
Seetanah (2011)	19 Island Economies	1990-2007 Annual	GMM	Reciprocal
Singh et al. (2010)	4 Caribbean Countries	1970-2008 Quarterly	Cointegration	Long-run None Short-Run TLG

Even the studies use the same countries as cases, they conclude with different results, possibly due to differences in data frequencies, variables or methodology used (Husein & Kara, 2011; Katırcıoğlu, 2009a). Previous studies mostly use annual data. Tourism receipts or tourist arrivals were used as proxies for tourism expansion. Different studies used either real GDP or per capita GDP growth rate as indicators of economic growth (Georgantopoulos, 2012). There are also some studies using real exchange rates as a proxy for external competitiveness such as Balaguer & Cantavella-Jorda (2002, Dritsakis (2004) and Chen & Chiou-Wei (2009). The results of the studies conducted for Turkey mostly produced the similar results (Gunduz & Hatemi-J (2005), Husein & Kara (2011), Zortuk (2009), Arslanturk et al. (2011), Aslan (2008), Yıldırım & Ocal (2004), Kırbas-Kasman & Kasman (2004), Bahar (2006)). They all found evidence supporting the TLG hypothesis; where Katırcıoğlu (2009a) and Yavuz (2006) rejects a relationship between tourism and economic growth in Turkey. On the other hand, Ongan & Demiroz (2005) has stated that there is a bidirectional causality supporting the reciprocal causal hypothesis.

Although the causal relationship between tourism expansion and economic growth seems to be indefinite depending on diverse contexts, analyzing the TLG hypotheses can definitely provide a better understanding of the interactions between tourism and economic growth for any country depending on tourism. Therefore, this study attempts to use structural break unit root tests and employ the VECM Granger causality framework in addition to ARCH/GARCH modelling to derive general conclusions about the hypothesis.

3. Methodology

To examine the causal relationships among selected variables, a three steps procedure was employed. In the first step the order of the integration of the variables were determined. As is well known, most of the macroeconomic variables usually contain unit roots, implying that they are non-stationarity (Nelson & Plosser 1982). Moreover, as Granger & Newbold (1974) argued, econometric analysis with non-stationary series lead to spurious regression problem. Before carrying out any Granger causality tests, determining the order of integration of the variables is required. Therefore, Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1981), Phillips-Perron (PP) (Phillips & Perron, 1988) and Kwiakowski-Philips-Schmidt-Shin (KPSS) (Kwiatowski et al, 1992) unit root tests were employed. Since in case of structural breaks in the data, traditional unit root tests are biased, Zivot & Andrews (1992) and Perron (1989) structural break unit root tests were also used. Because of the strong seasonality in economic growth and tourism receipts series, all of the unit root tests were applied to seasonally adjusted data obtained by TRAMO/SEATS seasonal adjustment method for these two variables.

Afterwards Johansen cointegration test introduced by Johansen (1988) and Johansen & Juselius (1990) was used to examine the existence of long and short-run relationships among variables. The Johansen multivariate cointegration procedure was preferred, since it does not suffer from a normalization problem and is robust to departures from normality (Gonzalo, 1994). In addition, it allows estimating the multivariate cointegrating vectors independently. The rank of cointegration (r) is tested by the use of two test statistics, namely the trace and the maximum eigenvalue statistics. The comparison of test statistics with the critical values show the presence of any cointegrating relations. Johansen cointegration analysis requires the determination of lag length with an unrestricted VAR model (Ozer & Coskun, 2011).

Final step involved implementation of the Granger causality test within the Vector Error Correction Model (VECM) framework. VECM framework is required if the variables are found to be cointegrated at rank (r), to examine causal relationships among variables. For this purpose, block exogeneity Wald test was used.

The following VEC model was used to determine the causal relationship.

$$\begin{bmatrix} \Delta LRGDP\_SA_t \\ \Delta LTR\_SA_t \\ \Delta LRGDP\_SA\_GARCH_t \\ \Delta LTR\_SA\_GARCH_t \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \end{bmatrix} + \begin{bmatrix} \beta_{11.1} \\ \beta_{21.1} \\ \beta_{31.1} \\ \beta_{41.1} \end{bmatrix} \begin{bmatrix} \beta_{11.1} & \beta_{12,1} & \beta_{13,1} & \beta_{14,1} \\ \beta_{21.1} & \beta_{22,1} & \beta_{23,1} & \beta_{24,1} \\ \beta_{31.1} & \beta_{32.1} & \beta_{33.1} & \beta_{34.1} \\ \beta_{41.1} & \beta_{42.1} & \beta_{43.1} & \beta_{44.1} \end{bmatrix} * \begin{bmatrix} \Delta LRGDP\_SA_{t-1} \\ \Delta LTR\_SA_{t-1} \\ \Delta LRGDP\_SA\_GARCH_{t-1} \\ \Delta LTR\_SA\_GARCH_{t-1} \end{bmatrix} +$$

$$\cdots + \begin{bmatrix} \beta_{11.i} & \beta_{12,i} & \beta_{13,i} & \beta_{14,,} \\ \beta_{21.i} & \beta_{22,i} & \beta_{23,i} & \beta_{24,i} \\ \beta_{31.i} & \beta_{32.i} & \beta_{33.i} & \beta_{34.i} \\ \beta_{41.i} & \beta_{42.i} & \beta_{43.i} & \beta_{44.i} \end{bmatrix} * \begin{bmatrix} \Delta LRGDP\_SA_{t-i} \\ \Delta LTR\_SA_{t-i} \\ \Delta LRGDP\_SA\_GARCH_{t-i} \\ \Delta LTR\_SA\_GARCH_{t-i} \end{bmatrix} + \begin{bmatrix} \varphi_1 \\ \varphi_2 \\ \varphi_3 \\ \varphi_4 \end{bmatrix} * (ect_{t-1}) + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \end{bmatrix} \quad (1)$$

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In equation (1), Δ is thedifference operator. (ect_{t-1}) denotes the lagged residual term obtained from the long-run relationship, ε_{1t} ,..., ε_{4t} are normally distributed with zero mean and finite covariance matrix error terms. The coefficients of the *ect* term, φ_1,..., φ_4 measure the error correction mechanism that derives the variables back to their long-run equilibrium relationship. Significant χ^2 test statistics for the (ect) terms indicate long and short run causality among the variables.

ARCH/GARCH family models are applied to derive the volatilities of economic growth and tourism receipts series. Traditional methods for time series modeling are based on the assumption of unconditional variances, however this assumption may not be true because of the volatility clusters those effecting the series (Coskun & Ozer, 2011). In that case, methods including variance inequalities such as ARCH/GARCH models should be employed. These models operate on the assumption of conditional variances allowing the variance to change over time. Engle (1982)'s ARCH model follows a stochastic procedure taking the conditional volatility of the conditional variances. In ARCH/GARCH models, conditional variance is calculated by the squared residuals of the regression model. These are mean zero, serially uncorrelated processes with non-constant variances conditional on the past, but constant unconditional variances (Engle, 1982).

Bollerslev (1986) converted the ARCH model by including lagged values of the conditional variances and introduced a new class of ARCH models called the generalized ARCH (GARCH) model. The simplest GARCH (1,1) specification is formulized as in Equations (2) and (3) (Bollerslev, 2008: 13):

$$Y_t = X_t\theta + \varepsilon_t \qquad (2)$$

$$\sigma_t^2 = \omega + \alpha\varepsilon_{t-1}^2 + \beta\sigma_{t-1}^2 \qquad (3)$$

Mean equation in (2) is a function of exogenous variables with an error term. σ_t^2 shows the conditional variance. Here ω is the constant term, ε_{t-1}^2 is the ARCH term measured as the lag of the squared residuals from the mean equation and σ_{t-1}^2 is the GARCH term representing the last period's forecast variance. The family is comprised of various representations introduced by different researchers, such as threshold ARCH (TARCH) by Zakoïan (1994) and Glosten, Jagannathan & Runkle (1993); exponential GARCH (EGARCH) by Nelson (1991), power GARCH (PGARCH) by Higgins & Bera (1992). The best fitted model is selected by a simple comparison of log-likelihood values and different information criteria, such as Schwarz information criteria (SIC) and loglikelihood ratio (LR).

Nelson (1991) introduced the EGARCH (Exponential GARCH) model in order to model asymmetric variance effects. If Z_t denotes a series of independent identically distributed standardized random variables with expected value 0 and variance 1. The general EGARCH model[58] given by Nelson (1991) is as follows:

$$\log \sigma_t^2 = \omega_t + \sum_{k=1}^{\infty} \beta_k g(Z_{t-k}),$$

where ω_t and β_k are the deterministic coefficients and $g(Z_t) = \theta Z_t + \gamma(|Z_t| - E|Z_t|)$, where $E[g\ (Z_t)]$ equals to zero.

[58] Some of the major differences between EGARCH model and GARCH model are as follow:

- Volatility of the EGARCH model, σ_t^2 , is an explicit multiplicative function of lagged innovations. On the contrary, volatility of the standard GARCH model is an additive function of the lagged error terms ε_t, which causes a complicated functional dependency on the innovations.
- In EGARCH model, volatility can react asymmetrically to the positive and negative news.
- the parameter restrictions for strong and covariance-stationarity for the distributions of Z_t coincide.
- The parameters in these two equations are not restricted to positive values.

4. Data and Empirical Analysis

To investigate the causal relationships among real GDP (LRDGP_SA) as a proxy for economic growth and tourism receipts (LTR_SA) as a proxy for tourism expansion, along with the uncertainties (volatilities or conditional variances) of these two variables, quarterly data over the period 1992:Q1-2014:Q1 was used. Data on real GDP statistics were obtained from Turkish Statistical Institute and data on tourism receipts and real exchange rates were obtained from the Turkish Republic Central Bank. To derive the volatility series of economic growth and tourism receipts, GARCH (1,1) and that EGARCH (1,1) model with an asymmetric order of 1 were used respectively. All variables were transformed by natural logarithms, except for the volatility series. Figure 1 depicts the time series plots of both original and adjusted variables.

Figure 1 Time Series Plots of Variables

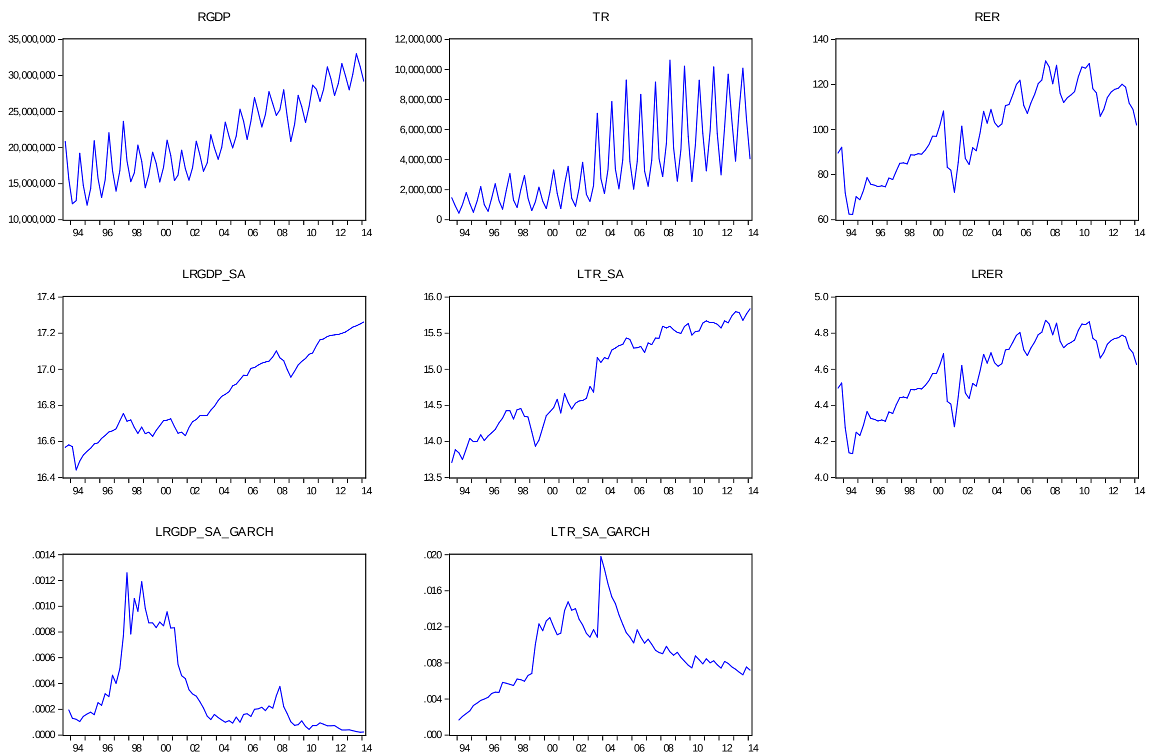

Table 2 presents the unit root tests results. According to these results, all unit root tests indicate that variables are first difference stationary, except for the KPSS test for LTR_SA_GARCH which is indicated as level stationary. When considering the structural break unit root tests, volatility series are level stationary without any structural breaks, however LTR_SA and LRGDP_SA have structural breaks and are non-stationary at their level values.

Table 2 Unit Root Test Results

Variable	**ADF**			**PP**			**KPSS**		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
LTR_SA	-0.835186	-3.048840	-	-0.835186	-3.069805	-	1.186608	0.119756*	-
DLTR_SA	-11.94661*	-11.88302*	-	-11.94639*	-11.88349*	-	0.033332*	-	-
LRGDP_SA	-0.092497	-2.428047	-	-0.168701	-2.469553	-	1.178206	0.164595	-
DLRGDP_SA	-8.367208*	-8.327275*	-	-8.381244*	-8.327871*	-	0.060707*	0.038265*	-
LTR_SA _GARCH	-	-	-0.384962	-	-	-0.365407	-	-	0.350012
DLTR_SA _GARCH	-	-	-9.142954*	-	-	-9.144891*	-	-	-
LRGDP_SA _GARCH	-	-	-0.846205	-	-	-1.036325	-	-	0.523796
DLRGDP_SA _GARCH	-	-	-12.04117*	-	-	-11.78601*	-	-	0.150301*
Structural Break	**LTR_SA**			**LRGDP_SA**		**LTR_SA_GARCH**		**LRGDP_SA_GARCH**	
	Intercept	Trend and Intercept		Intercept	Trend and Intercept	Intercept	Trend and Intercept	Intercept	Trend and Intercept
ZA	-4.596668	-5.192893* (2003Q3)		-3.838399	-3.815329* (1998Q2)	-4.106924	-	-3.658255	-
PP	-5.213524	-5.868036* (2003Q2)		-3.628585	-3.571734* (1997Q3)	-4.164913	-	-3.547732	-

* represents 5% significance level for Mac Kinnon one-sided critical values.
** Values in parentheses show the structural break dates.
*** Critical values for 5% significance level are; -3,46 for ADF and PP tests, -0.463 for KPSS test; -5,23 (intercept) and -5.59(intercept and trend) for PP -4.93 (intercept) and -5.08 (intercept and trend) for PP structural break unit root test.

Table 3 reports the results of cointegration tests. According to Johansen cointegration test results, there are three cointegration relationships between variables.

Table 3. Johansen Cointegration Test Results

Sıfır Hipotezi (H_0)	Alternatif Hipotez (H_1)	Without Trend		With trend	
		Trace Stat.	Crit. Val (5%)	Trace Stat.	Crit. Val (5%)
r=0	r>0	287.7172*	47.85613	331.1078*	63.87610
r≤1	r>1	148.0733*	29.79707	191.2669*	42.91525
r≤2	r>2	15.51878*	15.49471	56.23926*	25.87211
r≤3	r>3	1.037565	3.841466	2.707418	12.51798
Sıfır Hipotezi (H_0)	Alternatif Hipotez (H_1)	Without Trend		With trend	
		Max.Eigenvalue Stat.	Crit. Val (5%)	Max.Eigenvalue Stat.	Crit. Val (5%)
r=0	r>0	139.6439*	27.58434	139.8409*	32.11832
r≤1	r>1	132.5545*	21.13162	135.0277*	25.82321
r≤2	r>2	14.48121*	14.26460	53.53184*	19.38704
r≤3	r>3	1.037565	3.841466	2.707418	12.51798

*denotes rejection of the null hypothesis at 5% significance level.
**r indicates the number of cointegrating relationships according to Trace test results.
*** The number of lags is selected as 13 according to the unrestricted VAR model LR test statistic.
**** LRER was used as an exogenous variable in the equation.

Because of the existence of the cointegration among variables, Granger causality tests within the VECM framework was performed. Results of the Granger causality tests are presented in Table 4.

Table 4. Granger Causality Test Results

	χ^2-statistics (probabilities)				
Dependant Variable ↓	ΔLTR_SA	$\Delta LRGDP\_SA$	ΔLTR_SA_GARCH	$\Delta LRGDP\_SA\_GARCH$	All χ^2-statistics (probabilites)
ΔLTR_SA	-	28.14520** (0.0086)	18.29241 (0.1397)	27.19721* (0.0117)	59.62207* (0.0183)
$\Delta LRGDP\_SA$	65.22897** (0.0000)	-	31.17881** (0.0032)	68.03070** (0.0000)	135.9407** (0.0000)
ΔLTR_SA_GARCH	24.57171* (0.0263)	16.17475 (0.2398)	-	22.88422* (0.0431)	55.85342* (0.0392)
$\Delta LRGDP\_SA\_GARCH$	128.0761** (0.0000)	460.9187** (0.0000)	83.27810** (0.0000)	-	1168.501** (0.0000)

* represents significance at 5%
** represents significance at 1%

According to Granger tests results, there are some both short and long-run causalities. When the long run causalities are considered, all the variables are Granger causes of each other. For example, economic growth and volatility series are together a Granger cause of tourism expansion. Also, tourism expansion and its volatility together with economic volatility are a Granger cause of economic growth in total. Tourism volatility is Granger caused by economic growth, tourism expansion and economic volatility. Finally, economic growth, tourism expansion and tourism volatility are together the Granger causes of economic volatility.

In addition, there are bidirectional and unidirectional relationships between variables in the short run. According to the results, tourism expansion and economic growth are Granger causes of each other. Economic volatility Granger causes tourism expansion and vice versa. The same case is valid also between economic growth and its volatility and the two volatility variables. There are two unidirectional causalities found in the results. Tourism expansion Granger causes tourism volatility and tourism volatility Granger causes economic growth.

To investigate the Granger causality among variables for the out of sample periods, variance decomposition results are presented in Table 5.

Table 5 Results of Variance Decomposition

Variance Decomposition of **LRGDP_SA**:

Period	S.E.	LRGDP_SA	LTR_SA	LRGDP_SA_GARCH	LTR_SA_GARCH
1	0.010955	100.0000	0.000000	0.000000	0.000000
2	0.022898	57.81569	19.73324	3.570365	18.88070
3	0.031120	52.14076	24.00160	3.510168	20.34747
4	0.037258	45.51362	26.26812	4.465859	23.75240
5	0.041013	37.73534	23.76673	5.685234	32.81270
6	0.043232	34.17624	24.03146	5.120817	36.67148
7	0.045288	31.60862	24.03863	4.803343	39.54940
8	0.046971	29.42357	24.27830	4.489521	41.80861
9	0.048113	28.20945	23.58389	4.291964	43.91469
10	0.048655	27.58812	23.65951	4.611632	44.14075

Variance Decomposition of **LTR_SA**:

Period	S.E.	LRGDP_SA	LTR_SA	LRGDP_SA_GARCH	LTR_SA_GARCH
1	0.081460	1.009582	98.99042	0.000000	0.000000
2	0.085019	2.243125	95.27952	2.198984	0.278376
3	0.089960	2.032676	89.95906	2.012335	5.995926
4	0.094623	1.917875	82.00130	1.823661	14.25716
5	0.101862	5.571119	79.63284	2.050073	12.74597
6	0.112269	9.144020	76.50591	2.201415	12.14865
7	0.119475	10.36981	73.07710	4.270455	12.28263
8	0.131470	9.216379	61.13396	3.532770	26.11689
9	0.134435	9.359227	59.26054	3.503916	27.87632
10	0.140902	11.35883	55.83146	3.663731	29.14598

Variance Decomposition of **LRGDP_SA_GARCH**:

Period	S.E.	LRGDP_SA	LTR_SA	LRGDP_SA_GARCH	LTR_SA_GARCH
1	2.20E-05	5.960209	16.29413	77.74566	0.000000
2	6.11E-05	75.41970	3.464785	10.12361	10.99191
3	8.93E-05	48.59743	34.72747	8.564061	8.111039
4	0.000104	46.71744	39.54655	6.277848	7.458162
5	0.000114	40.88029	45.56065	7.286488	6.272571
6	0.000120	43.90912	42.59725	7.857181	5.636453
7	0.000123	43.59787	42.12225	7.709896	6.569981
8	0.000128	40.71843	45.79146	7.103667	6.386445
9	0.000129	40.85850	45.83335	7.031557	6.276593
10	0.000131	40.17354	45.95012	7.307588	6.568753

Variance Decomposition of **LTR_SA_GARCH**:

Period	S.E.	LRGDP_SA	LTR_SA	LRGDP_SA_GARCH	LTR_SA_GARCH
1	0.001217	0.941068	10.22770	1.101330	87.72990
2	0.001592	1.032223	28.01672	4.941574	66.00948
3	0.001620	2.925008	27.07723	5.937554	64.06021
4	0.001729	8.714905	25.62792	9.241400	56.41578
5	0.001840	9.545986	24.31655	8.981799	57.15567
6	0.001948	8.517513	28.76725	9.084494	53.63074
7	0.001987	8.193366	28.41578	10.47298	52.91787
8	0.002002	8.109389	28.30809	11.34741	52.23511
9	0.002077	9.546474	29.94777	10.59214	49.91362
10	0.002278	9.343975	38.50920	8.846961	43.29987

The results of variance decomposition are consistent with the VECM Granger test results. According to these results, economic growth is mostly effected by tourism expansion and tourism volatility and tourism expansion is an important determinant of economic volatility in the long run. On the other hand, tourism expansion and tourism volatility is substantially determined by themselves and their effect on economic growth and economic volatility is higher. Variance decomposition shows that the effects of tourism on the economic growth is greater than the effects of economic variables on tourism. Specifically; economic growth totally explains itself within the first period, however the contribution of tourism receipts (23%) and tourism volatility (44%) is highly remarkable at the end of 10th period. This indicates that tourism variables explain 67% of economic growth in total. Tourism expansion explains 98% of itself in the first period, however in the 10th period the contribution of tourism volatility (29%) and economic growth (11%) increase, meaning that effect of economic growth on tourism in minimal but influential. Economic volatility explains 77% of itself in the first period, nevertheless 40% is explained by economic growth and 45% is explained by tourism receipts in the 10th period. This is an important indicator for the influential capacity of tourism on economic growth uncertainties. Tourism volatility explains 87% of itself in the first period. At the end of 10th period it is explained by tourism receipts (38%) and economic volatility (8%). Again, this shows that economic variables have slight effects on tourism and tourism uncertainties.

5. Conclusion

Tourism industry in Turkey has been expanding since 1980s despite some drawbacks, such as economic crises, natural disasters etc. To overcome such challenges, the decision makers should consider the interactions among the determinants of tourism demand. This study attempts to provide a better understanding of the relationship between tourism expansion and economic growth by using different configurations such as data frequency, variables and methodologies to investigate the validity of the TLG hypotheses for Turkey. For this purpose, quarterly data for the period 1992Q1-2014Q1 is used and exchange rates is included as an exogenous variable in the model. The methodology of the study combines ARCH/GARCH model estimates of volatility series for tourism expansion and economic growth with a VECM based Granger causality analysis.

Based on the findings of the VECM Granger tests and variance decomposition analysis, volatilities of economic growth and tourism receipts should be considered in analysis, since they provide valuable information for policy makers. The interpretation of the causality test can help providing a tool to allocate limited resources in addition to developing appropriate tourism strategies.

The results of this study indicate that tourism expansion and economic growth have effects on each other, and uncertainties in economic growth affect tourism expansion in Turkey. Additionally, tourism uncertainties have significant effects on economic growth in the short run. As the results of Granger causalities indicated, there is feedback between tourism expansion and economic growth both in the short and long-run. Therefore, it is fair to conclude that sample evidence is supporting reciprocal causal hypotheses for Turkey.

Since the relationship between tourism expansion and economic growth is bidirectional, policies designed to improve one variable inevitably affect the other. Economic growth can be improved by strategic planning of the tourism industry and vice versa.

According to the empirical results of this study, in order to develop the tourism industry and sustain a steady economic growth, each policy decision has to consider a holistic economic view incorporating tourism. Thus, it can be possible to increase and stabilize the tourism industry as well as the whole economy. As tourism is dependent on economic decisions, public support in tourism by infrastructure, investments, incentives, promotion activities and supervision is necessary for the industry to expand.

This study is limited to the given sample period and the selected variables. Future research employing different economic or tourism related variables, such as current account deficits or number of tourist arrivals, is recommended.

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