TIME VARYING CAUSALITY BETWEEN EXCHANGE RATES AND TOURISM DEMAND FOR TURKEY

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ABSTRACT

Turkey is one of the top tourism destinations in the world and the tourism industry has become an indispensable source of income. The main inbound tourism market for Turkey is Europe with a 50% average of the total tourist arrivals followed by Russia and the Asian countries. Tourism is an important industry, especially for tourist receiving countries where tourism is a major source of foreign exchange earnings. As the foreign exchange earnings are directly related with the tourist expenditure, the effects of prices or more commonly the exchange rates should be considered in any demand study. Accordingly, this study attempts to reveal the time varying causal relationships between exchange rates and tourist arrivals for European inbound tourist markets. The time varying linkages between the nominal Euro exchange rate and tourist arrivals from the EU-15 countries (namely; Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom) to Turkey for the period 2002:01-2014:12 are investigated using time varying bootstrap analysis. The results indicate that time-varying causality is bidirectional for different periods and different countries, but existing for each tourism market.

Keywords: Tourism demand, Exchange rates, Turkey, Time varying bootstrap analysis.

1.INTRODUCTION

International tourism plays an increasingly significant role in the world economy since 1950s. International tourist arrivals has increased from 25 million in 1950s to 1,1 billion in 2014 (UNWTO, 2015) with a total contribution of 9.8% to the global GDP (WTTC, 2015a). The growth of tourism in Turkey has pursued the same path and become evident in 1982 by means of the Tourism Encouragement Act, allowing government incentives for tourism investments.

Turkey has been one of the top tourism destinations in the world and attracted over 40 million tourists. The total contribution of tourism to the Turkish economy is 12% through 34.3 billion US$ direct tourism receipts (WTTC, 2015b; Ministry of Culture and Tourism, 2015).

Turkey receives tourists from all over the world, however the main inbound tourist market is Europe with a 52% of the total tourist arrivals followed by Russia (24%) and Asian countries (15%) by 2014 (Ministry of Culture and Tourism, 2015). Turkey is a popular destination for Europeans, because it is a nearby country with various attractions, relaxed visa regime and attractive exchange rate (Coskun and Ozer, 2011). Mostly, European markets have similar structures in terms of the purpose of travel, length and period of stay, visitor profile and expenditure. Tourists prefer Turkey for travel, entertainment, sportive or cultural activities with a share of 55% (Ministry of Culture and Tourism, 2009), and this assumption is valid for the Europeans as well.

Tourism substantially contributes to countries' economies by generating GDP, creating employment and socio-economic development opportunities (Wu, Li & Song, 2012). Regarding the importance of tourism for a destination economy and its direct link to tourism-related businesses, tourism demand analysis has attracted increasing interest from researchers. According to Song et al. (2009), tourism demand is defined as 'the quantity of tourism products that consumers are willing and able to purchase under a specified period and a given set of factors'. These set of factors, in other words, the determinants of tourism demand may vary from economic variables to cultural differences or cyclical circumstances and have been studied thoroughly in the tourism literature (Uysal & Crompton, 1984; Crouch, 1994 etc.). The results of these researches indicate that economic variables have greater impacts on tourism demand than other variables and the most distinctive one is income followed by relative prices and then the exchange rates (Zhang et al, 2011).

The microeconomic theory argues that demand is sensitive to prices. Various studies have demonstrated the price elasticity of tourism demand is considerably higher than unit elasticity (Içoz, Var & Kozak, 1997). Tourists compare market prices at the destination with the cost of living at home and substitute destinations. Relative price is the ratio of consumer price indexes between destination countries or substitutes and at home. However, as Crouch (1994) argued, tourists are generally not well informed in advance about price levels and price changes in destinations whereas they are reasonably well informed about the exchange rate mechanisms. With limited information on the price levels of destinations, tourists may have a tendency to respond to a change in exchange rates (Lee, 2012). The depreciation of a local currency will act as a decrease in the prices and stimulate international tourist arrivals (Wang et al., 2008). Conversely, appreciation of local currency will influence both tourist arrivals to the country and tourist departures from the country as well. Accordingly, exchange rates are used as a proxy to measure price levels of different destinations in general. Because they are easier to obtain information and to understand, even to compare alternative destinations for tourists than relative prices or consumer price indices (Crouch, 1993).

The aim of this paper is to investigate the time-varying causal relationships between Euro exchange rate and tourism demand from the EU-15 countries (namely; Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom) by using bootstrap Granger non-causality tests with fixed size rolling subsamples developed by Balcilar, Ozdemir & Arslanturk (2010). The study is expected to contribute to a better understanding of tourist behavior interacting with exchange rates, as a proxy for relative prices. The results can be used by researchers, as well as practitioners to determine efficient market and price strategies and national policies for the tourism industry.

2. LITERATURE REVIEW

Uysal & O'Leary (1986) suggest exchange rates can be used as an independent variable along with per capita income, relative prices and promotional expenditures to predict and analyze international tourism demand. Furthermore, Webber (2001) states that exchange rate volatility affects tourists' destination choice and changes in the exchange rates are likely to have the same impact as relative price changes. That is the reason why exchange rate is a major determinant of tourist demand and exchange rate regimes with low uncertainty could promote tourism (Santana-Gallego et al, 2010; Wang et al., 2008). Fluctuating exchange rates can result in several different effects such as choosing a substitute destination or less traveling abroad, reducing the length of stay and the expenditures.

In tourism literature, there are many studies investigating the relationship between exchange rates and international tourism demand. These studies often argue whether fluctuations in the exchange rates effect demand or not by employing cointegration techniques, regression analysis and different methods. For example, Webber (2001) analyzed the long-run Australian outbound tourism demand for the period 1983Q1-1997Q4 for nine major tourism destinations by Johansen cointegration and Granger causality tests. The exchange rate volatility is found to be a significant determinant of the long-run tourism demand. Rosello, Aguilo & Riera (2005) modelled tourism demand for Balearic Islands from the UK and Germany by considering exchange rates as an independent variable, a determinant of tourism demand. Yap (2012) examined the effects of exchange rate volatility on Australian inbound tourism demand from 9 tourist generating countries by multivariate GARCH method for the period of 1991M1-2011M1 and found out appreciation/depreciation of a country's currency has impacts on demand volatility. Yap (2013) also investigated the impacts of exchange rates on Australia's domestic and outbound tourism demand using panel generalized least squares models and showed that the exchange rates influence both domestic and outbound travel decisions of the Australians.

Lee (2012) studied the causal relationship between foreign exchange rates and inbound/outbound tourism demand in South Korea. Johansen cointegration and Granger causality test were used for 1990M1-2010M9 monthly data. The results demonstrate there is a long-run relationship between exchange rates and inbound/outbound tourism demand. Also, exchange rates affect outbound tourism demand, but the inbound tourism was not affected. DeVita (2014) analyzed the impact of exchange rate regimes on international tourism flows of 27 countries over the period of 1980-2011 by employing SYS-GMM method. The findings of the study supports that maintaining a relatively stable exchange rate using right policy decisions, tourism demand may also kept stable. Corgel, Lane & Walls (2013) investigated the effects of exchange rates on hotel demand in the US using quarterly data for 1988Q1-2012Q1 with a single equation partial adjustment framework. The results support the hypothesis of exchange rates effect hotel demand on different scales. Tang et al. (2014) investigated the dependence between tourism demand and exchange rates for China's inbound tourism demand using Copula-GARCH models using monthly data for the period 1994M1-2011M12. Among the studied six tourist generating countries, only Russia was found to be extremely sensitive to exchange rate volatility, but in general exchange rates were concluded not to be a determinant for the selected countries.

Var, Mohammad & Icoz (1990) modelled the factors effecting international tourism demand for Turkey by including exchange rates as an independent variable. Icoz, Var & Kozak (1997) analysed the determinants of tourism demand with multivaritate OLS based regression model. The results indicated that exchange rates have important effects on tourism demand. Akis (1998) also suggested exchange rates as a determinant of tourism demand in addition to a number of economic variables such as per capita income, prices in the host country and cost of travel. DeVita & Kyaw (2013) argues if the exchange rate is an indicator of Turkish inbound tourism demand from Germany using quarterly data for the period 1996-2009 by employing GARCH method. They conclude that exchange rates are significant determinants of tourism demand.

Nevertheless, the studies investigating the time-varying nature of this relationship are limited, and missing for Turkey in particular. Time-varying parameter (TVP) method is mostly used for examining the causal relationship between tourism demand/receipts and economic growth. Song & Wong (2003) proposed this new TVP approach to tourism demand modelling. This method ignores the restrictive assumptions of traditional methods assuming that the parameters remain constant over the sample period. They tested the appropriateness of the TVP approach to tourism demand modelling based on the data set of Hong Kong tourism demand from six major tourism origin countries, and confirmed that the method gave better results.

Li, Song & Witt (2006) developed time varying parameter (TVP) linear almost ideal demand system (LAIDS) to compare fixed parameter model results. The findings indicated that the TVP-LAIDS outperformed the traditional methods in case it allowed evolution of demand over time. Wu, Li & Song (2012) also analyzed the dynamics of consumption behavior of top four tourist markets for Hong Kong using annual data for the period 1984-2008 with TVP-AIDS model considering three major expenditure categories including shopping, hotel accommodation and meals outside hotels. Song et al. (2011) employed structural time series model (STSM) combining time-varying parameter (TVP) regression approach to forecast quarterly tourist arrivals to Hong Kong from four key source markets using quarterly data for the period 1985Q1-2008Q4. They compared seven different methods and STSM and TVP approach outperformed for ex post and ex ante forecasts.

Dragouni, Filis & Antonakakis (2013) employed VAR-based spillover index to investigate the time-varying relationship between tourism and economic growth for selected European countries using monthly data for the period 1995-2012. The results of the study indicates the relationship is not stable over time, exhibiting patterns during major economic events and these patterns are more apparent for some specific countries. Arslanturk, Balcilar & Ozdemir (2011) investigated the causal link between tourism receipts and economic growth using rolling window and time-varying coefficient estimation method for South Africa for the period 1960-2011. The results indicate bidirectional causality between tourism receipt and economic growth, basically the opposite of full sample VECM indicating no causality.

Arslanturk, Balcilar & Ozdemir (2011) compared time-varying coefficient model with VECM based Granger causality to determine the causal relationship between tourism receipts and GDP for the period 1963-2006 for Turkey. The results indicate that VECM based Granger causality does not exist, whilst time-varying coefficients model shows that tourism receipts can be used to predict GDP after the 1980s.

This study is expected to fill the gap in tourism literature and lead to a better understanding of the nature of tourist behavior with respect to the changes in the exchange rates, particularly for Turkey. Following section explains the methodology used for this purpose in detail.

3. METHODOLOGY

In this study, we investigate the time-varying causal relationships between international tourist arrivals to Turkey from the EU-15 countries and the Euro exchange rate by using bootstrap Granger non-causality tests with fixed size rolling subsamples developed by Balcilar, Ozdemir & Arslanturk (2010). As mentioned in their study, if structural changes exist in the data, the examination of the causal relationships between variables cannot be adequate considering the full sample, since the dynamic linkages between variables can exhibit instability across different sub-samples.

In this approach, to test the causality relationship, Granger non-causality method was used. As is well known, a variable X does not Granger cause Y, if the past values of X does not help to predict Y. The Granger non-causality test is performed to determine whether the lagged values of X are jointly significant or not by carrying out joint restriction tests of the Wald, Lagrange multiplier (LM), and likelihood ratio (LR) statistics within the vector autoregression (VAR) framework. But, as indicated in Aye et al. (2014), to get valid results from the implementation of these tests, time series in question should be stationary. According to Balcilar & Ozdemir (2013), if the time series do not exhibit stationarity, then these tests may not have standard asymptotic distributions, creating difficulties in the levels estimation of VAR models.

To solve these problems, some solutions can be utilized. As is indicated by Balcilar, Ozdemir & Arslanturk (2010) and Aye et al. (2014), the first attempt to overcome these difficulties had been made Toda & Yamamoto (1995) and Dolado & Lutkepohl (1996) proposing a solution to obtain standard asymptotic distribution for the Wald test based on the estimation of an augmented VAR with I(1) variables, or the long-run causality test of VAR (p) coefficients. According to their solution, there has to be at least one unrestricted coefficient matrix under the null hypothesis to generate standard asymptotic distribution.

However, Shukur & Mantalos (1997) showed that proposed Wald test does not exhibit the correct size in small and medium-sized samples after investigating the size and power properties of eight different versions of the Granger non-causality test in standard and modified form based on the Monte Carlo simulations. Shukur and Mantalos (2000) also suggested that the small sample corrected LR tests exhibit relatively better power and size properties, even for small samples.

Same Manto Carlo simulations indicated that the critical values may improve by applying the residual-based bootstrap (RBB) method because of the reason that the true size of the test in a system of one to ten equations converges its nominal value (Balcilar, Ozdemir & Arslanturk, 2010). The results of Mantalos & Shukur (1998) indicate that, in the absence of cointegration, all standard tests that do not use the RBB method perform inadequately, especially in small samples. Furthermore, according to Mantalos (2000), the bootstrap test possesses the best power and size in almost all situations, regardless of cointegration properties. Therefore, based on the findings and reasons stated so far, we prefer to use RBB based modified-LR statistic to examine the causal relationships between exchange rates and tourism demand.

To illustrate the bootstrap-modified Granger causality, we use the following bivariate VAR (p) process:

$$\begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix} = \begin{bmatrix} \alpha_{10} \\ \alpha_{20} \end{bmatrix} + \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{bmatrix} \begin{bmatrix} y_{1t} \\ y_{2t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \quad (1)$$

where y_1 is international tourist arrivals; y_2 is Euro exchange rate. ε_{1t} and ε_{2t} are error terms with zero mean, independent white noise processes with nonsingular covariance matrix Σ and p is the lag order of the process which is determined by the Akaike information criteria (AIC) or Schwarz criteria (SC). Also, $\phi_{ij}(L) = \sum_{k=1}^{p} \phi_{ij,k} L^k$, *i,j*=1,2 and *L* is the lag operator which is defined as $L^k x_k = x_{t-k}$.

To test causal relationships between international exchange rates and tourist arrivals, we have to impose some restrictions on the coefficients in Eq. (1). For instance, to test that international tourist arrivals does not Granger cause exchange rates, we have to impose zero restrictions on the coefficients of $\phi_{21,i} = 0$ for *i*=1,2, … , p. In other words, the null hypothesis that international tourist arrivals does not Granger cause the exchange rates can be explicitly written as follows:

$$H_0 : \phi_{21,1} = \phi_{21,2} = \ldots = \phi_{21,p} = 0 \quad (2)$$

If this null hypothesis is not rejected; then, we can conclude that international tourist arrivals does not Granger cause exchange rates. Also, to test whether exchange rates Granger cause international tourist arrivals, we have to test the following null hypothesis:

$$H_0 : \phi_{12,1} = \phi_{12,2} = \ldots = \phi_{12,p} = 0 \quad (3)$$

Obviously, failing to reject the null hypothesis indicates that exchange rates does not Granger cause international tourist arrivals.

To test these hypotheses, we use the modified-LR statistic[41], which has χ^2 distribution with a degree of freedom equals to the number of restrictions imposed on coefficients. To compute the sample value of this test statistic, following expression is used:

$$LR = (T-k)\ln(\frac{\det S_R}{\det S_U}) \quad (4)$$

where *T* is the number of observations and *k* = 2 × (2p + 1) + p and denotes the small sample correction term, $\det S_R$ and $\det S_U$ are the determinants of the restricted and unrestricted covariance matrices respectively.

As specifically emphasized in Balcilar and Ozdemir (2013) and Aye et al. (2014), test procedures that used to test the null hypothesis above assume the coefficients of the VAR model used in testing are not subject to any structural break: In other words, they are assumed to remain constant over time. Therefore, to get reliable results from the analysis, this assumption should be hold. Otherwise, we have to identify the structural changes and take into the estimation using techniques such as sample splitting or dummy variables. However, these techniques, according to Balcilar and Ozdemir (2013), may cause a pre-test bias. Therefore, to solve the parameter non-constancy problem and avoid pre-test bias, we use the rolling-window bootstrap estimation following Balcilar, Ozdemir & Arslanturk (2010). In this estimation, to analyze the effect of structural change, the rolling-window Granger-causality tests, based on the modified bootstrap test is used. If there is a structural change in the coefficients of VAR model, one can find instability across different sub-samples of the dynamic linkages between variables in question. Considering this instability, we apply the bootstrap causality test to rolling-window sub-samples for $\mathrm{t} = \tau - l + 1, \tau - l, \ldots, \tau, \tau = l, l + 1, \ldots, \mathrm{T}$, where l is the size of the rolling window. Implementing the rolling-window technique, a researcher uses a fixed-length moving window sequentially from the beginning to the end of the sample by adding one observation from ahead and dropping one from behind (Balcilar and Ozdemir, 2013). Notice that, each rolling-window sub-sample includes l observations. In each step of the process, the causality test is applied to each sub-sample, providing a (T–l) sequence of causality tests, as opposed to just one because of the two main reasons (Nyakabawo et al. ,2015): First, the rolling window approaches recognize the fact that the relationship between variables changes over time. Secondly, there will be an instability across different sub-samples caused by structural change taken into account by rolling-window estimation.

[41] The details of the full explanation of the RBB Bootstrap procedure can be found in Nyakabawo et al. (2015) and Balcilar and Ozdemir (2013).

To examine the causal relationship between exchange rates and international tourist arrivals, we adopt three steps bootstrap rolling-window approach in four steps. In the first step of the process, we analyzed the unit-root properties of variables, by carrying out Carrion-i-Silvestre, Kim and Perron (2009) multiple break unit-root tests. Before implementing this test, we also performed Bai-Perron (2003) test to determine breaks in series. Secondly, to determine the parameter stability from the coefficients of the rolling-window VAR regressions, we perform the Sup-F, Mean-F, and Exp-F tests, which are developed Andrews (1993) and Andrews and Ploberger (1994). Then, we apply the LR test of parameter stability and the Johansen (1991) cointegration test to determine whether a cointegration relationship exists between the series, where we apply the fully modified ordinary least squares (FM-OLS) estimator to test for cointegration. Finally, we estimate the rolling VAR regressions and perform Granger causality tests using a fixed 156 monthly window. The results are obtained by 1000 bootstrap repetitions.

4 EMPIRICAL FINDINGS

This paper analyses the time-varying linkage between Euro exchange rate and Turkish international tourist arrivals from the EU-15 countries using monthly data for the period 2002M1-2014M12. Data for the exchange rates were obtained from Turkish Republic Central Bank and the data for tourist arrivals were obtained from the Ministry of Culture and Tourism websites. Eviews 8 and Gauss 10 software were used for analysis. The variables included in the analysis are as follows.

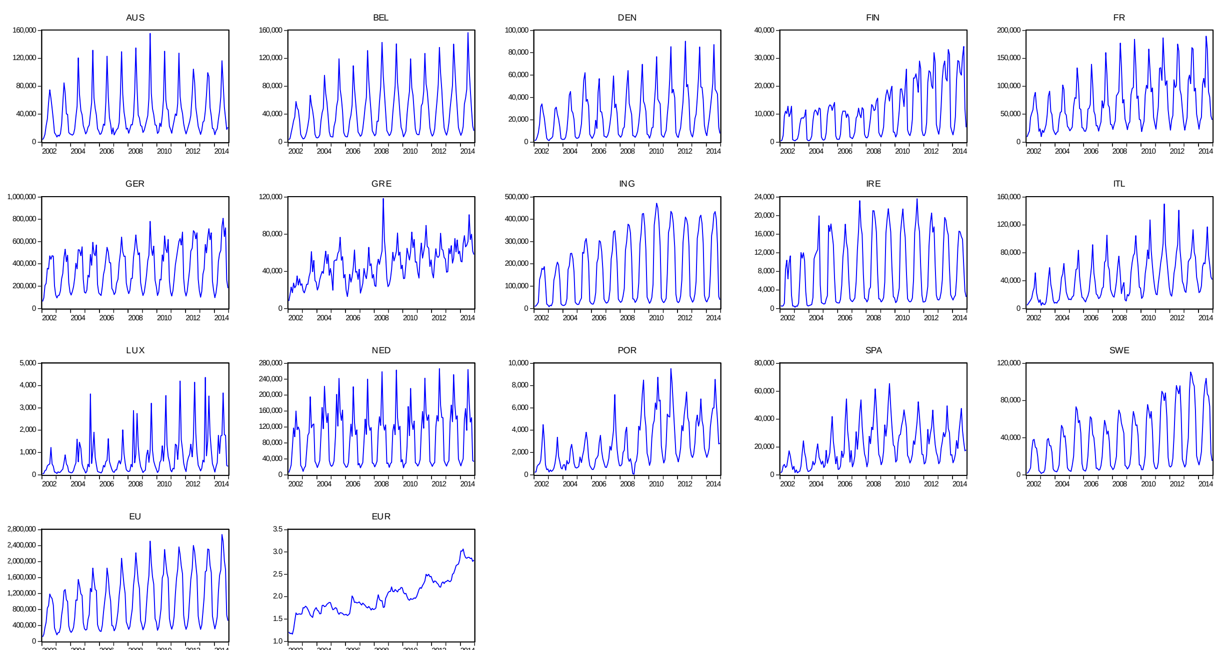

Figure 1 Graphs of Original Variables

Tourist arrival series are; LNAUS (Austria), LNBEL (Belgium), LNDEN (Denmark), LNFIN (Finland), LNFR (France), LNGER (Germany), LNGRE (Greece), LNING (United Kingdom), LNIRE (Ireland), LNITL (Italy), LNLUX (Luxemburg), LNNED (Netherlands), LNPOR (Portugal), LNSPA (Spain), LNSWE (Sweden) and LNEU (total tourist arrivals from EU-15 countries). LNEUR is the nominal exchange rate for Euro. All of the demand series show strong seasonality and trend, and Euro shows trend as seen in Figure .

To avoid bias in the analyses, the demand series were seasonally adjusted using TRAMO/SEATS method and natural logarithms of all variables were used. Figure shows the graphs of seasonally adjusted natural logarithms of the variables.

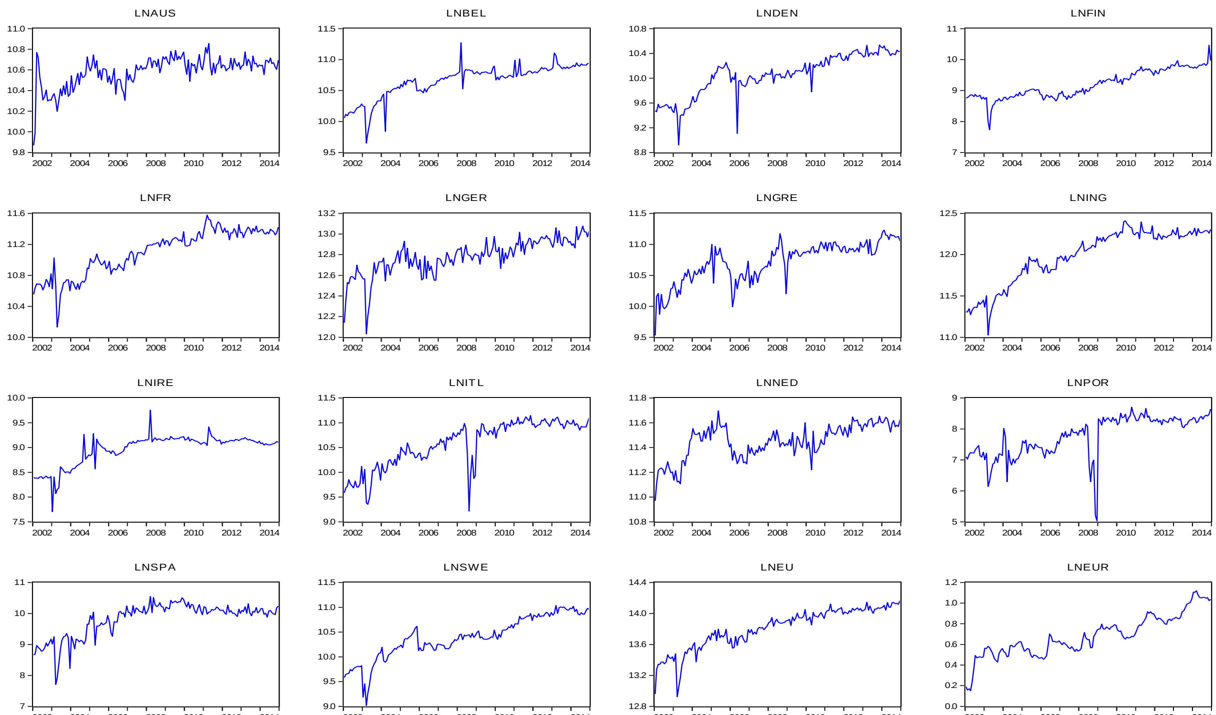

Figure 2 Graphs of Seasonally Adjusted Log-Values of Variables

Figure 2 also indicates multiple breaks in the series. Therefore, Bai-Perron multiple breakpoints test was used to determine significant breaks in the series. 1 summarizes the test results, indicating significant multiple breaks in all series.

Table 1 Bai-Perron Breakpoints Test Results

Variables	LNAUS	LNBEL	LNDEN	LNFIN	LNFR	LNGER	LNGRE	LNING	
# of Breaks	2	3	3	4	3	3	4	3	
Breakpoints	2004:01, 2007:06	2004:04, 2007:02,	2004:05, 2009:01,	2004:05, 2008:10,	2004:11, 2007:12,	2003M12, 2007M11,	2004M02, 2006M01,	2004M04, 2006M11,	

		2012:06	2011:01	2010:10, 2012:11	2010:09	2011M02	2008M01, 2010M09	2008M12	
Variables	LNIRE	LNITL	LNLUX	LNNED	LNPOR	LNSPA	LNSWE	LNEU	LNEUR
# of Breaks	2	3	3	4	2	2	3	3	5
Breakpoints	2004M07, 2007M01	2004M05, 2006M07, 2009M01	2004M01, 2008M01, 2011M04	2003M12, 2005M12, 2007M11, 2011M01	2004M12, 2009M01	2004M11, 2006M10	2003M12, 2008M01, 2011M04	2003M12, 2007M06, 2011M01	2003M12, 2006M05, 2008M10, 2011M03, 2013M02

As testing for stationarity is a crucial part of time series analysis, testing for unit roots using the right method is very important in this process. Structural break unit root test proposed by Carrion-i-Silvestre, Kim and Perron (2009) was used for this purpose. The stationarity levels are given in **Error! Not a valid bookmark self-reference.**. The variables are stationary at different levels, thus their level values or first differences were used in time-varying causality analysis according to these results.

Table 2 Structural Break Unit Root Test Results

Variables	Integration Level	Variables	Integration Level
LNAUS	I(1)	LNITL	I(0)
LNBEL	I(0)	LNLUX	I(1)
LNDEN	I(1)	LNNED	I(0)
LNFIN	I(0)	LNPOR	I(0)
LNFR	I(0)	LNSPA	I(1)
LNGER	I(1)	LNSWE	I(1)
LNGRE	I(1)	LNEU	I(1)
LNING	I(1)	LNEUR	I(0)
LNIRE	I(0)		
* ( ) show breaks in level and slope of time trend *PT test statistic was used to determine stationarity levels.			

Table 6 Time-Varying Causality Periods

Country	Austria	Belgium	Denmark	Finland	France	Germany	Greece	England	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Switzerland	EU
Exchange Rate → Tourism Demand	2009:01 2009:06- 2010:01 2010:01 2011:06- 2011:08 2014:06- 2014:08	2003:12- 2004:02 2005:06 2009:06- 2009:08, 2011:04- 2011:06	2007:07- 2007:11	2005:07 2011:11- 2012:10	2005:10 2008:11- 2009:01 2009:03 2011:02 2011:04- 2011:08 2011:09- 2011:11 2012:03- 2012:05 2014:09- 2014:11	2003:12- 2004-:02 2005:06- 2005:08 2011:06- 2011:10 2014:04- 2014:08 2014:11	2003:06- 2004:07 2009:05- 2010:02 2011:04 2012:02- 2012:09 2012:11- 2013:05 2014:09- 2014:12	2003:11- 2004:02 2004:04- 2004:05 2008:04- 2008:11 2010:11- 2011:01 2011:03 2011:05- 2011:08	2005:08 2006:05- 2006:06 2008:03 2010:02 2010:06 2011:03 2013:04 2013:11	2003:11- 2004:01 2004:03- 2004:05 2007:03- 2007:04 2008:07 2008:10 2010:01- 2010:02 2011:05- 2011:10 2012:02- 2012:05 2013:08- 2014:11	2004:07- 2005:04 2007:10- 2008:03 2008:05- 2009:02 2011:05 2012:03- 2012:05 2013:05 2014:06- 2014:12	2010:08 2011:03- 2011:12 2012:03 2013:07 2014:08- 2014:12	2003:12 2005:06- 2005:08 2008:06- 2008:12 2009:12- 2010:06 2013:05	2003:12- 2004:05 2005:11- 2005:12 2010:01- 2010:03 2010:06 2011:03- 2011:08 2012:06- 2012:09 2014:08- 2014:12	2004:04- 2004:05 2005:06- 2005:09 2005:11 2007:07- 2007:08 2010:02 2012:11 2013:01 2014:05- 2014:12	2003:12- 2004:02 2008:04 2008:06 2011:09- 2011:10 2012:01 2012:03- 2012:05 2014:10- 2014:11
Tourism Demand → Exchange Rate	2005:04- 2006:02 2007:08 2008:02 2008:05- 2008:07 2009:11 2010:05 2012:09	2003:10- 2003:12 2004:10- 2005:05 2007:07 2008:03- 2008:09 2009:11 2011:05- 2011:07 2014:09- 2014:12	2005:06- 2005:10 2006:06- 2007:09	2005:05- 2005-08 2008:08 2009:06 2009:11- 2010:01 2011:01- 2011:04 2011:05 2014:01- 2014:04	2003:10- 2004:02 2005:05- 2006:01 2006:03- 2006:06 2007:10 2008:01- 2008:06 2011:03 2013:02- 2013:12	2003:10- 2003:12 2004:12- 2005:07 2006:04 2007:08 2008:03- 2008:07 2009:03- 2009:08 2013:08	2004:08 2005:06- 2005:10 2006:03- 2006:05 2007:07 2007:09- 2007:12 2010:04- 2010:06 2011:02- 2011:03 2011:04- 2011:08 2013:09- 2013:12	2003:10- 2003:12 2004:12- 2005:07 2005:09- 2005:10 2006:02- 2006:04 2007:11 2008:02- 2008:07 2009:12 2011:09- 2011:10 2013:11	2006:01 2006:09- 2006:11 2007:09- 2007:11 2008:02- 2008:03 2008:05- 2008:09 2011:03- 2011:05 2012:05- 2012:07 2012:09- 2012:10 2014:07- 2014:12	2003:05- 2003:07 2003:10- 2004:02 2005:06- 2006:01 2006:03- 2006:04 2007:07 2008:03 2008:08 2008:10 2008:12 2009:07- 2009:12 2011:06 2014:03	2005:10 2006:03- 2006:04 2008:03- 2008:05 2013:06- 2013:08 2013:12	2005:07- 2005:09 2006:03- 2006:09 2008:03- 2008:06 2009:03- 2009:06 2012:03 2012:05- 2012:06 2014:02- 2014:03	2004:11- 2005:10 2006:03- 2006:04 2006:09- 2006:11 2007:04- 2007:07 2008:08- 2008:12 2009:12 2012:02- 2012:09 2013:10- 2013:12	2003:10- 2004:02 2004:04 2005:05- 2005:08 2005:10 2006:12 2007:04- 2007:07 2011:02- 2011:03 2011:05- 2011:07	2004:12- 2005:07 2005:09 2008:03 2008:05- 2008:07 2010:06 2011:01- 2011:07 2013:01- 2013:03 2014:07- 2014:10	2003:10- 2003:12 2004:12- 2005:07 2005:09- 2005:10 2006:04 2008:03- 2008:07 2009:04- 2009:06

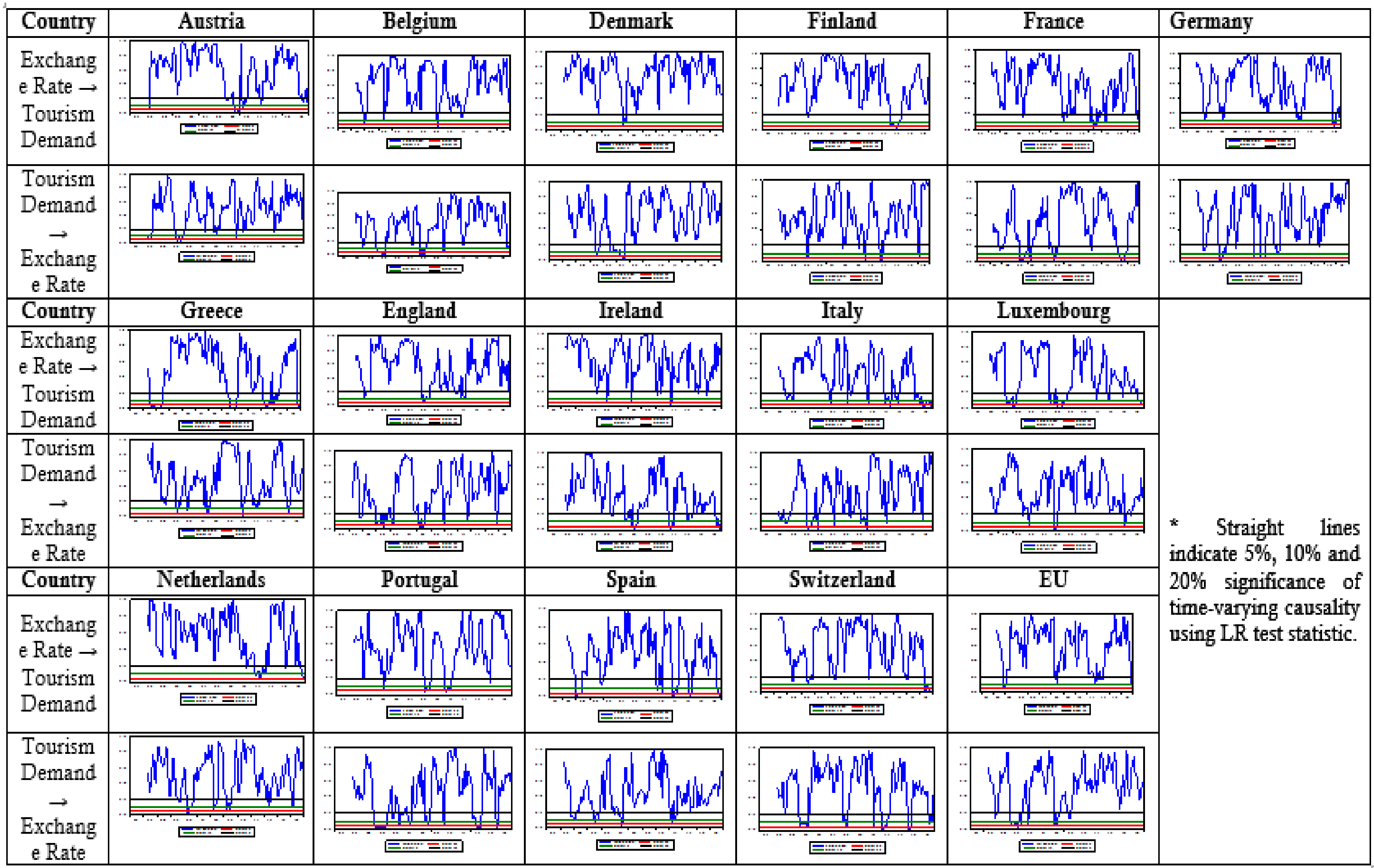

Figure 3
Time Varying Causality Graphs

The initial aim of this paper is to determine the time-varying nature of the relationship between the tourist demand from different countries and the exchange rate. In addition, whether there are differences or similarities in these relationships is at concern. For these purposes, the causal relationship between international tourist arrivals and Euro exchange rate, we use rolling-window approach combined with time-varying bootstrap analysis. As seen in Table 6, all of the series show significant results for causality in different time periods.

Figure 3 shows the time varying causal relationship between tourism demand and exchange rate. The graphs can be interpreted as each EU-15 country and the total EU-15 tourism demand are effected by the exchange rates and vice versa in some cases. Total demand is likely to affect the exchange rates more frequent than the opposite. LNEUR (Euro exchange rate) causes LNEU (total demand) for 13 months, on the other hand LNEU causes LNEUR for 22 months in the sample period.

Overall results are as follows: Luxembourg has the longest (38 months) period of causality and Denmark has the shortest (5 months) when causality from exchange rates to tourism demand is considered. On the opposite side, causality from tourism demand to exchange rate is strong for Portugal with 38 months, and poor for Denmark and Luxembourg with 9 months.

4 summarizes the findings of time-varying bootstrap analysis for the five top and bottom tourist generating countries included in the analysis.

Table 7 Time-Varying Causality for Top and Bottom 5 Countries

Top 5 ***Germany, UK, France, Greece & Netherlands***	**Bottom 5** ***Luxembourg, Portugal, Finland, Ireland & Denmark***
SIMILARITIES • *<u>Exchange Rate to Tourism Demand</u>* - Significant causality in 2011 for all countries - Longest period Greece (28 months) - UK 22 months, France 20 months, Netherlands and Germany 18 months • *<u>Tourism Demand to Exchange Rate</u>* - Similar causality periods for Germany, UK and France - Significant causality for all countries between 2006-2009 - Similar period length for causality - Longest period France (36 months)	**SIMILARITIES** • *<u>Exchange Rate to Tourism Demand</u>* - Causality period is shorter than 12 months for Ireland and Denmark - Denmark has the shortest causality period for both directions • *<u>Tourism Demand to Exchange Rate</u>* - None

- Greece 28 months, UK 27 months, Germany 25 months, Netherlands 23 months	
DIFFERENCES • *Exchange Rate to Tourism Demand* - Every country has significant causality for different periods • *Tourism Demand to Exchange Rate* - No evidence for causality in 2008 and 2009 only for Greece	**DIFFERENCES** • *Exchange Rate to Tourism Demand* - Denmark has causality only for the period 2007:07-2007:11 - Longest period Luxembourg (38 months) - Portugal 19 months, Finland 13 months, Ireland 9 months and Denmark 7 months • *Tourism Demand to Exchange Rate* - Different causality periods for each country - Causality for 2005:10 and 2006:06-2007:09 period is only valid for Denmark - Period length for causality is different for all countries - Longest period Portugal (38 months) - Ireland 25 months, Finland 17 months, Luxembourg and Denmark 9 months

As given in Table 7, the top five tourist generating countries show more similarities, where bottom five countries show more differences in the results. The top five countries also have similar length of causality; on the other hand, bottom five countries have different length and periods of causality. These results and their implications are discussed in the conclusion.

5 CONCLUSIONS

As traditional tourism demand modelling approaches have restrictions on demonstrating the changing behaviour of demand over time, this paper uses time-varying bootstrap analysis to overcome the constancy assumption of these approaches. This paper investigates the timewise change in the causal relationship between exchange rates and inbound tourism demand for Turkey. According to the demand theory, exchange rates act as a change in the price levels of tourism services in a destination country, therefore they affect the tourists' decision to choose among substitute destinations.

The findings of the study exhibits that exchange rates effect the tourism demand from each and every country from the EU-15 and also are affected by it in some cases, probably depending on the magnitude of demand. Europe is the largest inbound tourist market for Turkish tourism demand, generating 50% average of tourist arrivals. Therefore, analysing the tourist behaviour in relation with the exchange rates has important implications for the national economy, as well as the tourism industry. The top five tourist generating countries react similarly to the exchange rates. The tourists mostly prefer Turkey for holiday purposes, showing strong seasonality during summer months. As Turkey is considered an affordable country compared to its competitors like Spain, France and Greece, middle class generally prefers Turkey.

The empirical findings reflect these similarities and indicate that tourism demand either is affected by or affects exchange rates for similar periods and period lengths for these countries. For example, Germany, UK and France are the largest markets and they have an evident tendency to visit Turkey in summer, and the results show they Granger cause exchange rate during similar periods. In addition, the volume of tourists from these countries is so high that they can change the behaviour of microeconomic theory and influence the exchange rates. On the contrary, bottom five countries, e.g. Luxembourg and Portugal, tend to indicate different results for time-varying causality. The underlying reasons are probably the relative small volume of demand and different peak seasons for each county in this group. The causality periods are significantly short when compared to top five countries, and the direction of causality is evidently from exchange rates to tourism demand.

Tourism is an important source of income considering the exchange rate earnings, so the idea that tourists can affect the exchange rates by visiting a country is an important issue to be handled. Understanding the timewise behaviour of tourists depending on exchange rates may allow investors, managers and decision makers to implement better strategies and policies.

In our case, the possible reasons for larger markets, such as Germany or the UK, can be listed as limited or concentrated tourist markets and strong seasonality causing instability for the exchange rates. The reverse, where exchange rates affect tourism demand, has probable outcomes as losing customers to substitute destinations, decrease in the competitive power resulting in price and quality reduction, idle capacity and wasting resources. Therefore, to control either circumstance, the destination country has to implement policies to avoid seasonality and support diversification of tourism products. These strategies to reduce the effects of demand on exchange rates or vice versa could be listed as; supporting alternative tourism services in non-coastal areas, promoting different products, organizing publicity campaigns to relatively smaller markets.

The limitations of this paper is that only a typical tourism market, holiday travellers from Europe is considered and the method used does not show the sign of causality. Future research employing different methods could allow comparing different tourist markets to explain if the tourism demand increases or decreases the exchange rates, and vice versa.

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