Economic Modelling 33 (2013) 226–232

Contents lists available at SciVerse ScienceDirect

Economic Modelling

journal homepage: www.elsevier.com/locate/ecmod

Does tourism development promote economic growth in transition countries? A panel data analysis☆

Ming Che Chou

Tourism Department, Shih-Hsin University, Taipei, Taiwan

ARTICLE INFO

Article history:
Accepted 8 April 2013

Keywords:
Tourism spending
Economic growth
Transition countries
Dependency
Heterogeneity
Panel causality test

ABSTRACT

This study examines causal relationships between tourism spending and economic growth in 10 transition countries for the period 1988–2011. Panel causality analysis, which accounts for dependency and heterogeneity across countries, is used herein. Our empirical results support the evidence on the direction of causality, and are consistent with the neutrality hypothesis for 3 of these 10 transition countries (i.e. Bulgaria, Romania and Slovenia). The growth hypothesis holds for Cyprus, Latvia and Slovakia while reverse relationships were found for the Czech Republic and Poland. The feedback hypothesis also holds for Estonia and Hungary. Our empirical findings provide important policy implications for the 10 transition countries being studied.

1. Introduction

Over the past several decades, the relationship between tourism spending and economic growth for both developing and developed countries has been extensively researched.[1] Knowledge of the causal relationship between tourism spending and economic growth is of particular importance to policy makers, as tourism policies are becoming major concerns for these countries. The World Travel and Tourism Council (WTTC) (2011) argues that Travel & Tourism continues to be one of the world's largest industries. The total impact of the industry is impressive. In 2011, it contributed to 9% of global GDP, a value of over US$6 trillion, and accounted for 255 million jobs. Over the next ten years, this industry is expected to grow by an average of 4% annually. This will bring it to 10% of global GDP, or about US$10 trillion. By 2022, it is anticipated that it will account for 328 million jobs, 1 in every 10 jobs on the planet.

It has long been recognized that tourism can have an impact on economic activity (Dwyer et al., 2004). Tourism is seen as increasing overall economic activity, and this increase in activity is normally seen as desirable. Often, the positive impacts on economic activity are inaccurately described as the “benefits” of tourism, as explained below (Dwyer and Forsyth, 1993). Increasing attention has been focused on international tourism as an important potential growth sector for many countries (Brohman, 1996). The speedy growth of tourism causes an increase in household income and government revenues through multiplier effects, improvements in the balance of payments and growth in the number of tourism-promoted government policies. As such, the development of tourism has usually been considered a positive contribution to economic growth (e.g. Khan et al., 1995; Lee and Kwon, 1995; Lim, 1987; Oh, 2005).[2]

Chao et al. (2006) indicate that an expansion of tourism increases the relative price of nontraded goods, improves the tertiary terms of trade and yields a gain in revenue. However, if this increase in the relative price of nontraded goods results in a lowering of demand for the capital used in the traded sector, subsequent de-industrialization in the traded goods sector may lower resident welfare. Chao et al. (2009) further point out that if the output effect is dominant, expansion of tourism raises employment and welfare; however, under realistic conditions tourism may lower both labor employment and welfare due to rising costs. Holzner (2011) empirically analyzes the danger of a Dutch Disease Effect in tourism-dependent countries over the long run. Data on 134

E-mail address: choumc@cc.shu.edu.tw.

[1] We refer to the recent survey on the tourism spending and economic growth nexus by Lee and Chang (2008), Arslanturk et al. (2011) and Schubert et al. (2011).

[2] International tourism is recognized as having a positive effect on the increase of long-run economic growth through different channels. First, tourism is a significant foreign exchange earner which allows for payment of imported capital goods or the basic inputs used in the production process. Second, tourism plays an important role in spurring investment in new infrastructure and competition between local firms and firms in other tourist countries. Third, tourism stimulates other economic industries by direct, indirect and induced effects. Fourth, tourism contributes to generating employment and increasing income. Fifth, tourism can cause positive exploitation of economies of scale in national firms (see Andriotis, 2002; Fagance, 1999; Lin and Liu, 2000; Schubert et al., 2011). Finally, tourism is an important factor in the diffusion of technical knowledge, stimulation of research and development and the accumulation of human capital. Tourism has become a common development focus for many countries.

0264-9993/$ – see front matter © 2013 The Author. Published by Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.econmod.2013.04.024

countries of the world over the period 1970–2007 were used. He first works on the long-run relationship between tourism and economic growth in a cross-country setting. Empirical results are then checked in a panel data framework on GDP per capita levels that allows control for reverse causality, non-linearity and interactive effects. He finds that there is no danger of a Beach Disease Effect. On the contrary, not only do tourism-dependent countries not face real exchange rate distortion and de-industrialization, they also experience higher than average economic growth rates. Investment in physical capital, such as transport infrastructure, is complementary to investment in tourism.

While the vast majority of empirical research already performed has focused on both developing and developed countries, there have been a few studies that address the causal relationship between tourism spending and economic growth in transition countries. This paper re-investigates the relationship between tourism spending and economic growth using a sample of 10 transition countries (i.e. Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia and Slovenia) over the period 1988–2011, and focusing on country-specific analysis.[3] These 10 transition countries started their liberalization programs in the late 1980s and early 1990s. Outward-oriented growth strategy is quite common in these 10 transition countries. This paper targets the transition countries. At the same time, both developed and developing countries are included to gain more insight into relevant tourism policies in different nations.

One major motivation of our study article is to complement prior studies via advanced econometric methodologies which can account for situations in the real world. Lee and Chang (2008) and Holzner (2011) find that different countries show different causality directions between tourism spending and economic growth. This suggests that tourism spending–growth relationships may be country-specific; therefore, it is necessary to recognize the heterogeneous nature of the countries under investigation. In cross-country investigations, heterogeneity across countries is present because of differences in economic conditions or social-cultural backgrounds. Dependence among countries is unavoidable due to cooperation or competition, particularly with the current prevalence towards globalization. Failing to account for these concerns jointly has constrained deeper analysis in extant studies.

In recognition of this situation, this study employs country-specific causality tests developed by Kónya (2006) to discover the dynamic and causal relationships between tourism sector growth and overall economic growth. These tests will allow for country-specific effects to be more readily uncovered. We test whether any causal relationship between tourism sector growth and economic growth exists, by using a bootstrap panel Granger causality test on a sample of 10 transition countries over the period 1988–2011. To the best of our knowledge, this is the first study to use a bootstrap panel Granger causality test to study the relationship between tourism spending and economic growth in the 10 transition countries. We hope that this study can bridge the gap in the current literature between tourism sector growth and economic growth.

In detecting causal linkage between tourism spending and economic growth, we utilize the panel causality approach instead of the time series method, since panel data sets include information not only from the time series dimension but also the cross-section dimension. Based on this advantage of panel data analysis, non-stationary panel tests (unit root, cointegration and causality) have become a more powerful econometric methodology in recent years. Our recent experience with economic dynamics shows that turbulence in a country may easily be transmitted to other countries through international trade and economic and financial integration, which are basic features among these transition countries. This demonstrates the importance of taking into account cross-section dependency in empirical analysis. Even though there is strong dependence across countries, it is well known that each country sustains its own dynamics in the development process. This fact calls attention to the need to control for cross-country heterogeneity when initiating an empirical modeling strategy.[4] In light of these thoughts, the panel causality method we utilize is capable of controlling for dependency and country-specific characteristics across countries. This paper aims to follow a systematic modeling strategy. In examining causal linkages between the variables under concern, we separately test for both cross-section dependence and cross-country heterogeneity by using recently developed and statistically powerful tests instead of assuming the existence of these dynamics in our panel data set. We contribute to the existing literature by jointly addressing the two concerns.

One advantage of the econometric methodology proposed by Kónya (2006) is that it allows for contemporaneous correlation across countries. We utilize a more meaningful and effective analysis methodology than cross-sectional analysis or time series analysis on a country-by-country basis because interaction between tourism sectors across countries usually exists. For instance, many tourism companies around the world have branches outside their home countries, and we can reasonably expect that market structures or government policies in foreign countries will exert an indirect impact on business firms. If many tourism firms expand their business in the markets of foreign countries, the tourism companies will have a significant business impact in connection with policies outside their home countries. Competition with foreign tourism firms will also affect domestic tourism markets, possibly through the introduction of innovative products. Therefore, a country's tourism sector development may likely be correlated with other countries over time.

Empirical results show that the growth hypothesis holds for Cyprus, Latvia and Slovakia, shows a reverse relationship for the Czech Republic and Poland, and a feedback hypothesis for Estonia and Hungary. Although the tourism–growth relationship is significant in most of the sampled countries, there is still no significant relationship between the two variables in some countries, including Bulgaria, Romania and Slovenia.

This paper is organized as follows. Section 2 briefly reviews some of the previous literature, and Section 3 describes the data used in this study. Section 4 outlines the econometric methodology employed. Section 5 discusses the empirical findings and their policy implications. Section 6 is devoted to concluding remarks.

2. Review of the literature

Because of the potential economic benefits of tourism, such as increases in foreign exchange earnings, income, employment and taxes (Archer, 1995; Balaguer and Cantavella-Jorda, 2002; Dritsakis, 2004; Durbarry, 2002), many governments have engaged in tourism development for the purpose of promoting economic growth (Sahli and Nowak, 2007). Analyzing the relationship between tourism development and economic growth has been a popular topic in recent tourism literature (Arslanturk et al., 2011; Kim et al., 2006). However, researchers have reached mixed and sometimes conflicting results despite the common choice of time series techniques as a research methodology.

Empirical studies have shown inconsistent or even contradictory results in terms of a tourism-led economic growth hypothesis.[5] Examples of country specific studies include; Dritsakis (2004), who

[3] To date, studies that have analyzed the causal relationship between tourism development and economic growth have been limited, especially in the case of transition countries, and results have been mixed. Oh (2005) argues that it is necessary to investigate the hypothesis in numerous destination countries for the purpose of generalization.

[4] Tang and Jang (2009) point out that in previous empirical studies based upon different countries, inconsistent results may be a reflection of the country effect. Countries could differ in terms of the weight of tourism on their overall economies (Oh, 2005), the size and openness of the economy (Kim et al., 2006) and production capacity constraints (Dwyer et al., 2000). The tourism–economy relationship could also differ from one country to another.

[5] Earlier studies on the relationships between tourism development and economic growth are currently "unfortunately blurry" due to different results for different countries in the same subject or region, different time periods within the same country and different methodologies in different regions.

finds a bi-directional causal relationship in Greece; Kim et al. (2006) and Lee and Chien (2008), who report on a bi-directional causality in Taiwan, and Oh (2005), who discovers an economy-driven tourism growth in Korea. Considering that Taiwan and Korea are similar in terms of economic development and the role of tourism in their economies, such conflicting results are unexpected. Kim et al. (2006) explain that differences may arise from the size of the economies. Taiwan is more sensitive to tourism demand, given its relatively smaller economy. Balaguer and Cantavella-Jorda (2002) examine the role of tourism in the long-term economic development in Spain. Tourism in Spain accounts for approximately 5.9% of GDP, which makes the country the second largest recipient of international tourist earnings after the United States. The tourism-led growth hypothesis is confirmed through cointegration and causality testing in Spain. As for Turkey, while Gunduz and Hatemi-J (2005) find a unidirectional causality from tourism to economic growth using leveraged bootstrap causality tests for the period 1963–2002, Ongan and Demiroz (2005) suggest bidirectional causality between international tourism and economic growth in Turkey for the period of 1980Q1–2004Q2 using Granger causality test results. Considering that these empirical studies are based on different countries, the inconsistent results may be a reflection of the country effect (Tang and Jang, 2009). Because countries can be different in terms of the weight of tourism on their overall economies (Oh, 2005), the size and openness of the economy (Kim et al., 2006) and production capacity constraints (Dwyer et al., 2000), the tourism–economy relationship can also differ from one country to another.

In a multi-country study, Chen and Chiou-Wei (2009) show that the tourism-led economic growth hypothesis was supported for Taiwan with a reciprocal causal relationship found for South Korea. Lee and Chang (2008) investigate the casual relation between tourism development and economic growth for OECD and non-OECD countries (including those in Asia, Latin America and Sub-Sahara Africa) over the 1990–2002 period. Evidence obtained in their study indicates that there is a unidirectional causality relationship between tourism development and economic growth in OECD countries, a bidirectional relationship in non-OECD countries and only a weak relationship in Asia. Holzner (2011) empirically analyzes the danger of a Dutch Disease Effect in tourism dependent countries over the long run. Data on 134 countries of the world over the period 1970–2007 are used. The long-run relationships between tourism and economic growth are analyzed in a cross-country setting. The results are then checked in a panel data framework on GDP per capita levels, that allows control for reverse causality, non-linearity and interactive effects. It is found that there is no danger of a Beach Disease Effect. On the contrary, tourism dependent countries do not face real exchange rate distortion and de-industrialization, but do have higher than average economic growth rates. Investment in physical capital such as transport infrastructure is complementary to investment in tourism.

3. Data

This empirical study uses annual data on 10 transition countries (i.e. Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Poland, Romania, Slovakia and Slovenia) over the period 1988–2011. The variables in this study include domestic tourism spending (*DS*) and per capita real GDP (*PRGDP*). Domestic tourism spending is expressed in terms of billions of U.S. dollars. Per capita real GDP is measured in constant 2005 U.S. dollars. The source of data is the World Economic Outlook Database. Summary statistics are provided in Tables 1 and 2. The per capita real GDP datasets indicate that Cyprus and Bulgaria had the highest and lowest average per capita incomes of $15,248.58 and $3291.86 dollars, respectively. The Jarque–Bera (J–B) normality test results indicate that per capita real GDP datasets for these 10 transition countries are approximately normal.

Table 2 summarizes the descriptive statistics for domestic tourism spending. It appears that the highest and lowest mean domestic tourism spending observed is in Poland and Cyprus, respectively. The Jarque–Bera (J–B) normality test results indicate that domestic tourism spending datasets for these 10 transition countries have approximately normal distribution with the exception of the Czech Republic.

Table 1
Summary statistics of real GDP per capita.

Country	Mean	Max.	Min.	Std. dev.	Skew.	Kurt.	J.–B.
Bulgaria	3291.86	4781.04	2427.07	838.79	0.68	1.93	2.98
Cyprus	15248.58	17973.67	11683.01	1920.37	−0.22	1.73	1.79
Czech Republic	10848.19	14285.71	8611.80	1934.48	0.66	1.97	2.81
Estonia	7779.12	12480.64	4549.72	2603.20	0.42	1.77	2.22
Hungary	8928.19	11258.23	6748.30	1648.31	0.11	1.44	2.46
Latvia	5430.43	8762.10	3163.08	1727.35	0.33	2.00	1.44
Poland	6730.72	10356.95	4347.71	1919.03	0.43	1.93	1.86
Romania	4045.59	5615.67	3101.51	787.54	0.60	1.99	2.46
Slovakia	10864.66	15734.29	7332.38	2636.01	0.57	2.05	2.22
Slovenia	14944.03	20822.61	10301.35	3483.30	0.26	1.66	2.07

Note: The sample period is from 1988 to 2011.

4. Methodology

4.1. Testing cross-section dependence

One important issue in a panel causality analysis is to take into account possible cross-section dependence across countries. A high degree of globalization, international trade and financial integration make a country sensitive to economic shocks in other countries. It is worthwhile noting here that ignoring cross-section dependency leads to substantial bias and size distortions (Pesaran, 2006), suggesting that testing for cross-section dependence is a crucial step in panel data analysis.

To test for cross-sectional dependency, the Lagrange multiplier (LM) test of Breusch and Pagan (1980), which has been extensively used in empirical studies, was used. The procedure for computing the LM test requires an estimation of the following panel data model:

$$PRGDP_{it} = \alpha_i + \beta_i' DS_{it} + u_{it} \text{ for } i = 1, 2, \ldots, N; \quad t = 1, 2, \ldots, T, \tag{1}$$

where *PRGDP* (*DS*) represents per capita real GDP (domestic tourism spending), i is the cross section dimension, t is the time dimension and α_i and β_i are respectively the individual intercepts and slope coefficients allowed to vary across states. In the LM test, the null hypothesis of no-cross section dependence is: $H_0 : Cov(u_{it}, u_{jt}) = 0$ for all t, and $i \neq j$ is tested against the alternative hypothesis of cross-section dependence $H_1 : Cov(u_{it}, u_{jt}) \neq 0$ for at least one pair of $i \neq j$. In order to test the null hypothesis, Breusch and Pagan (1980) developed the LM test as:

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2, \tag{2}$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pair-wise correlation of the residuals from the Ordinary Least Squares (OLS) estimation of Eq. (1) for each i. Under the null hypothesis, the *LM* statistic has an asymptotic chi-square with $N(N-1)/2$ degrees of freedom. It is important to note that the *LM* test is valid for N being relatively small and T sufficiently large.

Pesaran (2004) proposes a cross-section dependency test (CD test) for panel data models where $T \to \infty$ and $N \to \infty$ in any order. However, the *CD* test is subject to decreasing power when the population average pair-wise correlations are zero, even if the underlying individual population pair-wise correlations are non-zero (Pesaran et al., 2008). In

Table 2
Summary statistic of travel expense (unit: billion).

Country	Mean	Max.	Min.	Std. dev.	Skew.	Kurt.	J.–B.
Bulgaria	2.66	4.37	1.21	1.05	0.27	1.80	1.73
Cyprus	0.28	0.41	0.13	0.07	−0.37	2.15	1.26
Czech Republic	5.35	9.92	3.29	1.28	1.52	7.93	33.68***
Estonia	0.31	0.53	0.11	0.14	0.21	1.59	2.16
Hungary	3.89	5.14	2.97	0.74	0.46	1.88	2.12
Latvia	0.44	0.79	0.20	0.18	0.58	1.92	2.52
Poland	4.06	5.93	2.11	1.21	0.05	1.60	1.95
Romania	2.74	4.57	1.41	0.77	0.35	2.56	0.67
Slovakia	1.60	2.71	0.37	0.75	0.04	1.65	1.82
Slovenia	1.35	1.71	0.92	0.29	−0.20	1.36	2.84

Note: 1. The sample period is from 1988 to 2011.
*** Indicates significance at the 0.01 level.

stationary dynamic panel data models, the CD test fails to reject the null hypothesis when the factor loadings have a zero mean in the cross-sectional dimension (Sarafidis et al., 2009). In order to deal with these problems, Pesaran et al. (2008) propose a bias-adjusted test, a modified version of the LM test using the exact mean and variance of the *LM* statistic. The bias-adjusted *LM* test is:

$$LM_{adj} = \sqrt{\left(\frac{2T}{N(N-1)}\right)}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\frac{(T-k)\hat{\rho}_{ij}^2-\mu_{Tij}}{\sqrt{\nu_{Tij}^2}}, \tag{3}$$

where μ_{Tij} and ν_{Tij}^2 are respectively the exact mean and variance of $(T-k)\hat{\rho}_{ij}^2$ provided in Pesaran et al. (2008). Under the null hypothesis, with first $T\rightarrow\infty$ and then $N\rightarrow\infty$, the LM_{adj} test is asymptotically distributed as standard normal.

4.2. Testing slope homogeneity

The second issue in a panel data analysis is to decide whether or not the slope coefficients are homogenous. The causality from one variable to another, by imposing the joint restriction for the whole panel, is the strong null hypothesis (Granger, 2003). Moreover, the homogeneity assumption for the parameters is unable to capture heterogeneity due to country specific characteristics (Breitung, 2005).

The most familiar way to test the null hypothesis of slope homogeneity $H_0:\beta_i=\beta$ for all *i*- against the hypothesis of heterogeneity $H_1:\beta_i\neq\beta_j$ for a non-zero fraction of pair-wise slopes for $i\neq j$, is to apply the standard *F* test. The *F* test is valid for cases where the cross section dimension (N) is relatively small, the time dimension (T) of the panel is large, the explanatory variables are strictly exogenous and the error variances are homoscedastic. By relaxing the homoscedasticity assumption in the *F* test, Swamy (1970) developed the slope homogeneity test on the dispersion of individual slope estimates from a suitable pooled estimator. However, both the *F* and Swamy test require panel data models where *N* is small relative to *T* (Pesaran and Yamagata, 2008). Pesaran and Yamagata (2008) proposed a standardized version of Swamy's test (the $\tilde{\Delta}$ test) for testing slope homogeneity in large panels. The $\tilde{\Delta}$ test is valid as $(N,T)\rightarrow\infty$ without any restrictions on the relative expansion rates of *N* and *T* when the error terms are normally distributed. In the $\tilde{\Delta}$ test approach, the first step is to compute the following modified version of Swamy's test:

$$\tilde{S}=\sum_{i=1}^{N}\left(\hat{\beta}_i-\tilde{\beta}_{WFE}\right)'\frac{x'_iM_\tau x_i}{\tilde{\sigma}_i^2}\left(\hat{\beta}_i-\tilde{\beta}_{WFE}\right), \tag{4}$$

where $\hat{\beta}_i$ is the pooled OLS estimator, $\tilde{\beta}_{WFE}$ is the weighted fixed effect pooled estimator, M_τ is an identity matrix, and $\tilde{\sigma}_i^2$ is the estimator of σ_i^2.[6] The standardized dispersion statistic is developed as:

$$\tilde{\Delta}=\sqrt{N}\left(\frac{N^{-1}\tilde{S}-k}{\sqrt{2k}}\right). \tag{5}$$

Under a null hypothesis with the condition of $(N,T)\rightarrow\infty$ as long as $\sqrt{N}/T\rightarrow\infty$ and the error terms normally distributed, the $\tilde{\Delta}$ test has an asymptotic standard normal distribution. The small sample properties of the $\tilde{\Delta}$ test can be improved under normally distributed errors by using the following bias adjusted version:

$$\tilde{\Delta}_{adj}=\sqrt{N}\left(\frac{N^{-1}\tilde{S}-E(\tilde{z}_{it})}{\sqrt{\mathrm{var}(\tilde{z}_{it})}}\right), \tag{6}$$

where the mean is $E(\tilde{z}_{it})=k$ and the variance $\mathrm{var}(\tilde{z}_{it})=2k(T-k-1)/T+1$.

4.3. Panel causality analysis

The existence of both cross-section dependency and heterogeneity across 10 transition countries requires a panel causality method that will account for those dynamics. The bootstrap panel causality approach proposed by Kónya (2006) is able to account for both cross-section dependence and country-specific heterogeneity. This approach is based on a Seemingly Unrelated Regression (SUR) estimation of the set of equations and the Wald tests with individual country-specific bootstrap critical values.[7]

The system to be estimated in the bootstrap panel causality approach can be written as:

$$\begin{aligned}
y_{1,t} &= \alpha_{1,1}+\sum_{i=1}^{ly_1}\beta_{1,1,i}y_{1,t-i}+\sum_{i=1}^{lx_1}\delta_{1,1,i}x_{1,t-i}+\varepsilon_{1,1,t}\\
y_{2,t} &= \alpha_{1,2}+\sum_{i=1}^{ly_1}\beta_{1,2,i}y_{2,t-i}+\sum_{i=1}^{lx_1}\delta_{1,2,i}x_{2,t-i}+\varepsilon_{1,2,t}\\
&\vdots\\
y_{N,t} &= \alpha_{1,N}+\sum_{i=1}^{ly_1}\beta_{1,N,i}y_{N,t-i}+\sum_{i=1}^{lx_1}\delta_{1,N,i}x_{1,N,t-i}+\varepsilon_{1,N,t}
\end{aligned} \tag{7}$$

and

$$\begin{aligned}
x_{1,t} &= \alpha_{2,1}+\sum_{i=1}^{ly_2}\beta_{2,1,i}y_{1,t-i}+\sum_{i=1}^{lx_2}\delta_{2,1,i}x_{1,t-i}+\varepsilon_{2,1,t}\\
x_{2,t} &= \alpha_{2,2}+\sum_{i=1}^{ly_2}\beta_{2,2,i}y_{2,t-i}+\sum_{i=1}^{lx_2}\delta_{2,2,i}x_{2,t-i}+\varepsilon_{2,2,t}\\
&\vdots\\
x_{N,t} &= \alpha_{2,N}+\sum_{i=1}^{ly_2}\beta_{2,N,i}y_{N,t-i}+\sum_{i=1}^{lx_2}\delta_{2,N,i}x_{N,t-i}+\varepsilon_{2,N,t}
\end{aligned}, \tag{8}$$

where *y* denotes *PRGDP* (per capita real GDP), *x* refers to *DS* (Domestic tourism spending), and *l* is the lag length. Since each equation in this system has different predetermined variables, and the error terms might be contemporaneously correlated (i.e. cross-sectional dependency), these sets of equations are the SUR system.

[6] In order to save space, we refer to Pesaran and Yamagata (2008) for the details of estimators and to Swamy's test.

[7] Since country-specific bootstrap critical values are used, the variables in the system do not need to be stationary, suggesting that the variables are used in level form irrespectively of their unit root and cointegration properties. Therefore, the bootstrap panel causality approach does not require any pre-testing for panel unit root and cointegration analyses. By imposing country specific restrictions, we can also identify which and how many countries exist in Granger causal relationships.

In the bootstrap panel causality approach, there are alternative causal linkages for a country in the system where: (i) there is one-way Granger causality from x to y if not all $\delta_{1,i}$ are zero, but all $\beta_{2,i}$ are zero, (ii) there is one-way Granger causality running from y to x if all $\delta_{1,i}$ are zero, but not all $\beta_{2,i}$ are zero, (iii) there is two-way Granger causality between x and y if neither $\delta_{1,i}$ nor $\beta_{2,i}$ are zero and (iv) there is no Granger causality between x and y if all $\delta_{1,i}$ and $\beta_{2,i}$ are zero.[8]

5. Findings and implications

5.1. Empirical results

As outlined earlier, testing for cross-sectional dependency and slope homogeneity in a panel causality study is crucial for selecting an appropriate estimator. Taking into account cross-sectional dependency and country-specific heterogeneity in empirical analysis is crucial since countries are highly integrated and have a high degree of globalization in economic relations. Therefore, our empirical study starts by examining the existence of cross-sectional dependency and heterogeneity across the countries in concern. To investigate the existence of cross-section dependence, we carried out four different tests (LM, CD_{lm}, CD and LM_{adj}) and illustrate the results in Table 3. It is clear that the null of no cross-sectional dependency across the countries was strongly rejected at the conventional levels of significance, implying that the SUR method is more appropriate than a country-by-country OLS estimation.[9] This finding indicates that a shock occurring in one of the transition countries seems to be transmitted to other countries. Table 3 also reports the results from the two slope homogeneity tests ($\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$). Both tests reject the null hypothesis of the slope homogeneity hypothesis, supporting country-specific heterogeneity. The rejection of slope homogeneity implies that the panel causality analysis, by imposing a homogeneity restriction on the variable of interest, results in misleading inferences. In this respect, the panel causality analysis based on estimating a panel vector autoregression and/or panel vector error correction model by means of generalized method of moments and of pooled ordinary least square estimators, is not an appropriate approach for detecting causal linkages between tourism spending and economic growth in these 10 transition countries.

The existence of cross-sectional dependency and heterogeneity across transition countries supports evidence of the suitability of the bootstrap panel causality approach. The results from the bootstrap panel Granger causality analysis[10] are reported in Tables 4 and 5. Results show a one-way Granger causality from domestic tourism spending to economic growth in Cyprus, Latvia and Slovakia at the 10% significant level. A reverse relationship from economic growth to tourism spending was found for both the Czech Republic and Poland,[11] and a feedback hypothesis was found for both Estonia and Hungary. However, we find that neutral relationships exist for Bulgaria, Romania and Slovenia. If we look at Tables 4 and 5, the signs of the coefficients for most of the countries are positive, with the exception of the Czech Republic, Estonia, Hungary and Poland. For both Estonia and Hungary, we find that tourism spending exerts a significant and negative impact on economic growth. These results are consistent with those of Chao et al. (2006, 2009), that an increase in the relative price of nontraded goods results in a lowering of the demand for the capital used in the traded sector. Subsequent de-industrialization in the traded goods sector may lower resident welfare. If the output effect is dominant, expansion in tourism raises employment and welfare; however, under realistic conditions tourism may lower both labor employment and welfare due to rising costs.

Table 3
Cross-sectional dependence and homogeneous tests.

CD_{BP}	290.073***
CD_{LM}	25.833***
CD	15.981***
LM_{adj}	36.501***
$\tilde{\Delta}$	55.225***
$\tilde{\Delta}_{adj}$	2.571***
Swamy Shat	256.973***

*** Indicates significance at the 0.01 level.

The mixed results found in our study indicate that the direction of causality between tourism development and economic growth in these 10 transition countries may be determined by various factors (Kim et al., 2006). We speculate on the effects of the size of the national economy, the level of openness of the country and the level of travel restrictions as feasible factors in the differences among these 10 transition countries. In addition to these factors, the degree of dependence on tourism, tourism destination life cycles, and levels of economic development may be considered as some of the other determinants.

5.2. Economic and policy implications

Our empirical findings have four major policy implications. First, if domestic tourism spending brings about economic growth, the implication is that travel expenses stimulate economic growth; therefore, economic growth is dependent on domestic tourism spending, suggesting that negative travel shocks and travel conservation policies may depress economic growth. Our results show a one-way Granger causality from domestic tourism spending to economic growth in Cyprus, Latvia and Slovakia, implying that tourism development is of great importance to economic growth in these countries.

Second, a Granger causality running from economic growth to domestic tourism spending demonstrates that travel conservation policies have little adverse or no effect on economic growth. A relationship between economic growth and tourism spending was found for both the Czech Republic and Poland, indicating that economic growth can increase the demand for tourism and lead to the development of tourism sectors in these two countries.

Third, a feedback relationship between travel expense and economic growth implies that excessive travel protection and reduced travel consumption may lead to pressure on economic activity. We found a feedback hypothesis for both Estonia and Hungary. This result suggests that

[8] It is important to note here that since results from the causality test may be sensitive to the lag structure. Determining optimal lag length(s) is crucial for robustness of findings. As indicated by Kónya (2006), the selection of optimal lag structure is important because the causality test results may depend critically on the lag structure. In general, both too few and too many lags may cause problems. Too few lags mean that some important variables have been omitted from the model, and this specification error will usually cause bias in the retained regression coefficients, leading to incorrect conclusions. On the other hand, too many lags waste observations, and these specification errors will usually increase the standard errors of the estimated coefficients, making the results less precise. For a relatively large panel, equations and variables with varying lag structures will lead to a substantial increase in the computational burden. In determining lag structure we follow Kónya's approach in that maximal lags are allowed to differ across variables and equations. We estimate the system for each possible pair of ly_1, lx_1, ly_2 and lx_2, respectively, by assuming 1 to 4 lags and then choosing the combinations which minimize the Schwarz Bayesian Criterion.

[9] Cross-sectional dependency implies that examining causal linkages between tourism spending and economic growth in the transition countries requires taking into account information through estimations of causality regressions. In the presence of cross-sectional dependency, the SUR approach is more efficient than the country-by-country ordinary least-squares (OLS) method (Zellner, 1962). Therefore, the causality results obtained from the SUR estimator developed by Zellner (1962) will be more reliable than those obtained from the country-specific OLS estimations.

[10] We refer to Kónya (2006) for the bootstrap procedure that demonstrates how the country specific critical values are generated.

[11] Oh's (2005) argument is that when tourism is only a small portion of the GDP, the relationship is more likely to be an economy-driven tourism growth. However, if we look at Table 2, both the Czech Republic and Poland have the highest and second highest tourism spending, respectively, when compared to the rest of the countries. Our results from both the Czech Republic and Poland are not consistent with this expectation.

Table 4
Travel expense does not Granger cause GDP.

Country	Coefficient	Wald statistics	Bootstrap critical value		
			10%	5%	1%
Bulgaria	0.861	7.653	9.468	13.437	23.778
Cyprus	1.080	10.204*	8.880	12.792	21.295
Czech Republic	−0.950	5.374	9.209	13.125	24.035
Estonia	−1.413	10.613*	9.553	13.637	23.858
Hungary	−5.036	12.277**	7.350	12.188	20.862
Latvia	4.586	30.718**	10.408	14.791	30.876
Poland	−0.914	3.928	8.868	12.784	27.583
Romania	1.523	4.478	9.501	12.456	27.048
Slovakia	2.406	24.267***	14.088	21.963	45.060
Slovenia	0.782	0.433	9.885	15.784	28.112

Note: 1. **, and * indicate significance at the 0.05 and 0.1 levels, respectively.
2. Bootstrap critical values are obtained from 10,000 replications.

for both Estonia and Hungary, tourism development and economic growth are endogenous, indicating that the two factors mutually influence each other, and that this reinforcement may have important implications for the conduct of economic or tourism development policies in these two countries. This result also implies that excessive travel protection and reduced travel consumption may lead to pressure on economic activity in these two countries.

Fourth, if the neutrality between domestic tourism spending and economic growth holds, this will allow policy makers to develop travel policies that are not dependent on economic activity. Our empirical results support the neutrality hypothesis for Bulgaria, Romania and Slovenia, indicating that neither tourism development nor economic growth is sensitive to each other in these 3 countries. One can attribute the neutrality between tourism spending and economic growth to a relatively small contribution of domestic tourism spending to overall output. Thus, tourism spending may have little or no impact on economic growth in these 3 countries.

The time series approaches overlook cross-sectional dependency across countries in the causality test; therefore, they may result in misleading inferences regarding the nature of causality between domestic tourism spending and economic growth. We find strong evidence for the existence of cross-section dependence among transition countries. It might be concluded that policy implications driven from the causality approach account for cross-sectional dependency and seem to be more appropriate. Furthermore, we also detected cross-country heterogeneity in the panels of transition countries, implying that each country develops its tourism policies.

6. Conclusions

This study applies the bootstrap panel Granger causality approach to test whether domestic tourism spending promotes economic growth. We used data from 10 transition countries over the period of 1988–2011. Our empirical results indicate that for 3 of these 10 countries (Bulgaria, Romania and Slovenia), the neutrality hypothesis is in the nature of a causal direction between tourism spending and economic growth. Our results also support evidence on the growth hypothesis for Cyprus, Latvia and Slovakia. A reverse relationship was found for the Czech Republic and Poland, while a feedback hypothesis held for Estonia and Hungary. Our empirical findings provide important policy implication for the 10 transition countries under study.

Table 5
GDP does not Granger cause travel expense.

Country	Coefficient	Wald statistics	Bootstrap critical value		
			10%	5%	1%
Bulgaria	0.017	2.101	5.413	7.534	13.812
Cyprus	0.017	1.211	5.346	7.942	14.805
Czech Republic	0.016	11.417**	5.611	7.765	13.580
Estonia	0.025	19.516***	6.678	9.281	17.438
Hungary	0.034	24.550***	6.430	8.890	15.049
Latvia	0.004	0.494	5.625	7.952	13.889
Poland	0.031	28.678***	5.657	8.418	13.791
Romania	0.001	0.012	5.365	8.492	14.725
Slovakia	0.001	0.024	5.447	7.736	12.398
Slovenia	0.003	0.292	5.140	6.769	14.092

Note: 1. *** and ** indicate significance at the 0.01 and 0.05 levels, respectively.
2. Bootstrap critical values are obtained from 10,000 replications.

Acknowledgment

We would like to thank the editor and two anonymous referees for their highly constructive comments which make this paper more valuable. The usual disclaimer applies.

References

Andriotis, K., 2002. Scale of hospitality firms and local economic development: evidence from Crete. Tourism Management 23 (4), 333–341.
Archer, B., 1995. Importance of tourism for the economy of Bermuda. Annals of Tourism Research 22 (4), 918–930.
Arslanturk, Y., Balcilar, M., Ozdemir, Z.A., 2011. Time-varying linkages between tourism receipts and economic growth in a small open economy. Economic Modelling 28, 664–671.
Balaguer, J., Cantavella-Jorda, M., 2002. Tourism as a long-run economic growth factor: the Spanish case. Applied Economics 34, 877–884.
Breitung, J., 2005. A parametric approach to the estimation of cointegration vectors in panel data. Econometric Reviews 24, 151–173.
Breusch, T., Pagan, A., 1980. The LM test and its application to model specification in econometrics. Review of Economic Studies 47, 239–254.
Brohman, J., 1996. New directions in tourism for third world development. Annals of Tourism Research 23 (I), 48–70.
Chao, C.-C., Hazari, B.R., Laffargue, J.-P., Sgro, P.M., Yu, E.S.H., 2006. Tourism, Dutch disease and welfare in an open dynamic economy. The Japanese Economic Review 57 (4), 501–515.
Chao, C.-C., Hazari, B.R., Laffargue, J.-P., Yu, E.S.H., 2009. A dynamic model of tourism, employment and welfare: the case of Hong Kong. Pacific Economic Review 14 (2), 232–245.
Chen, C.-F., Chiou-Wei, S.Z., 2009. Tourism expansion, tourism uncertainty and economic growth: new evidence from Taiwan and Korea. Tourism Management 30, 812–818.
Dritsakis, N., 2004. Tourism as a long-run economic growth factor: an empirical investigation for Greece using causality analysis. Tourism Economics 10 (3), 305–316.
Durbarry, R., 2002. The economic contribution of tourism in Mauritius. Annals of Tourism Research 29 (3), 862–865.
Dwyer, L., Forsyth, P., 1993. Assessing the benefits and costs of inbound tourism. Annals of Tourism Research 20 (4), 751–768.
Dwyer, L., Forsyth, P., Madden, J., Spurr, R., 2000. Economic impacts of inbound tourism under different assumptions regarding the macroeconomy. Current Issues in Tourism 3 (4), 325–363.
Dwyer, L., Forsyth, P., Spurr, R., 2004. Evaluating tourism's economic effects: new and old approaches. Tourism Management 25 (2004), 307–317.
Fagance, M., 1999. Tourism as a feasible option for sustainable development in small island developing states (SIDS): Nauru as a case study. Pacific Tourism Review 3, 133–142.
Granger, C.W.J., 2003. Some aspects of causal relationships. Journal of Econometrics 112, 69–71.
Gunduz, L., Hatemi-J, A., 2005. Is the tourism-led growth hypothesis valid for Turkey? Applied Economics Letters 12, 499–504.
Holzner, M., 2011. Tourism and economic development: the beach disease? Tourism Management 32, 923–933.
Khan, H., Phang, S., Toh, R., 1995. The multiplier effect: Singapore's hospitality industry. The Cornell Hotel and Restaurant Administration Quarterly 36 (1995), 64–69.
Kim, H.J., Chen, M.H., Jang, S.C., 2006. Tourism expansion and economic development: the case of Taiwan. Tourism Management 27, 925–933.
Kónya, L., 2006. Exports and growth: Granger causality analysis on OECD countries with a panel data approach. Economic Modelling 23, 978–992.
Lee, C.-C., Chang, C.-P., 2008. Tourism development and economic growth: a closer look at panels. Tourism Management 29, 180–192.
Lee, C.-C., Chien, M.-S., 2008. Structural breaks, tourism development, and economic growth: evidence from Taiwan. Mathematics and Computers in Simulation 77 (2008), 358–368.
Lee, C., Kwon, K., 1995. Importance of secondary impact of foreign tourism receipts on the South Korean economy. Journal of Travel Research 34 (1995), 50–54.
Lim, C., 1987. Review of international tourism demand models. Annals of Tourism Research 24 (4), 835–849.
Lin, B.H., Liu, H.H., 2000. A study of economies of scale and economies of scope in Taiwan international tourist hotels. Asia Pacific Journal of Tourism Research 5, 21–28.
Oh, C.-O., 2005. The contribution of tourism development to economic growth in the Korean economy. Tourism Management 26, 39–44.

Ongan, S., Demiroz, D.M., 2005. The contribution of tourism to the long-run Turkish economic growth. Journal of Economics 53, 880–894.
Pesaran, M.H., 2004. General diagnostic tests for cross section dependence in Panels. Cambridge Working Papers in Economics No. 0435. Faculty of Economics, University of Cambridge.
Pesaran, M.H., 2006. Estimation and inference in large heterogeneous panels with multifactor error structure. Econometrica 74, 967–1012.
Pesaran, M.H., Yamagata, T., 2008. Testing slope homogeneity in large panels. Journal of Econometrics 142, 50–93.
Pesaran, M.H., Ullah, A., Yamagata, T., 2008. A bias-adjusted LM test of error cross-section independence. The Econometrics Journal 11, 105–127.
Sahli, M., Nowak, J.J., 2007. Does inbound tourism benefit developing countries? A trade theoretic approach. Journal of Travel Research 45 (4), 426–434.
Sarafidis, Vasilis, Yamagata, Takashi, Robertson, Donald, 2009. A test of cross section dependence for a linear dynamic panel model with regressors. Journal of Econometrics 148 (2), 149–161.
Schubert, S.F., Brida, J.G., Risso, W.A., 2011. The impacts of international tourism demand on economic growth of small economies dependent on tourism. Tourism Management 32, 377–385.
Swamy, P.A.V.B., 1970. Efficient inference in a random coefficient regression model. Econometrica 38, 311–323.
Tang, C.-H., Jang, S.C., 2009. The tourism–economy causality in the United States: a sub-industry level examination. Tourism Management 30, 553–558.
WTTC, 2011. Annual Reports, Progress and Priorities 2011/11. The World Travel and Tourism Council.
Zellner, A., 1962. An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. Journal of the American Statistical Association 57, 348–368.