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Abstract

The current literature on the tourism-economic growth causal relationship is rather contested. Thus, the aim of this paper is to revisit this ambiguous relationship from a more holistic view, providing a comprehensive study of destinations across the globe which takes into account the key dynamics that influence tourism and economic performance. More specifically, we focus on 113 countries over the period 1995–2011, grouped into clusters based on six criteria, which reflect their economic, political and tourism dimensions. A Panel Vector Autoregressive model is employed to reveal the tourism–economy interdependencies across these clusters. Overall, the economic–driven tourism growth hypothesis seems to prevail in most cases, although some short–lived bidirectional causalities are also identified. Thus, depending on the economic, political and tourism status of a destination, different policy implications apply.

Keywords: tourism-economic growth; panel vector autoregressive model; panel impulse responses; clusters.

JEL codes: C32; F43; L83; O40; O57.

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1 Introduction

Since the seminal papers by Copeland (1991), Hazari and Sgro (1995) and Lanza and Pigliaru (2000), the link between tourism and economic growth has received considerable attention and generated a great amount of research in international tourism studies. The theoretical premise of this enquiry is that the injection of tourism income would spillover positive effects on the wider economy through direct, indirect and induced channels (e.g. employment, business activities and balance of payments). On the other end of the spectrum, the economic climate along with the economic policies that are applied to the destination could directly or indirectly encourage the development of the tourism sector and thus increase tourism income (see, for example, Chatziantoniou et al., 2013).

Relevant scholarly work on this topic sought to address the question of whether there is a causal direction of effects between the tourism sector and national economies. This question was mainly approached through time-series analyses of individual countries, or on some occasions, through cross-section and panel data models (see, inter alia, Chen and Chiou-Wei, 2009; Apergis and Payne, 2012; Chang et al., 2012; Antonakakis et al., 2015).

The bulk of these studies postulate the existence of spillover effects between the two factors, which run either from tourism to the economy (tourism-led economic growth hypothesis) or from the economy to tourism (economic–driven tourism growth hypothesis) (see, Parrilla et al., 2007; Payne and Mervar, 2010; Schubert et al., 2011, among others). At the same time, there are researchers who support the existence of bidirectional causalities or no causalities at all (see, for example, Katircioglu, 2009; Ridderstaat et al., 2014; Antonakakis et al., 2015). The aim of this paper is to shed some more light on this ambiguous relationship by examining the dynamic links between tourism and economic growth in 113 countries over the period 1995-2011.

In particular, we attempt to disentangle this intricate relationship through the application of a Panel Vector Autoregressive model (PVAR) approach along with panel impulse response functions (PIRFs) to data on tourism (proxied by either international tourism receipts, international tourism expenditures or international tourist arrivals) and economic growth. To our best knowledge, this is the first study that employs a PVAR approach, to examine the economic growth–tourism nexus in such a comprehensive panel of countries. We argue that the degree of economic growth that is attributable to tourism (or the reverse) may depend on various country–specific characteristics. For this reason, we cluster our sample countries on the basis of six criteria: their (a) standards of living, (b) level of development, (c) government effectiveness,

(d) political regime, (e) level of tourism specialisation and (f) tourism competitiveness. These criteria reflect three dimensions (economic, political and tourism) that are key for revealing the actual dynamics between tourism and the economy.

The advantages of using a PVAR methodology relative to methods previously used to examine the relation between tourism and economic growth are several. First, VARs are extremely useful when there is little or ambivalent theoretical information regarding the relationships among the variables to guide the specification of the model. Second and more important, VARs are explicitly designed to address the endogeneity problem, which is one of the most serious challenges of the empirical research on tourism and economic growth (see, for instance, Lee and Chang, 2008; Holzner, 2011; Chang et al., 2012). VARs help to alleviate the endogeneity problem by treating all variables as potentially endogenous and explicitly modelling the feedback effects across them.

Third, impulse response functions based on VARs can account for any delayed effects on and of the variables under consideration and thus, determine whether the effects between tourism and growth are either short-run, long-run or both. Such dynamic effects cannot be captured by panel regressions. Forth, PVARs allow us to include country fixed effects that capture time–invariant components that may affect tourism and growth, such as country size. Fifth, time fixed effects can also be added to account for any global (macroeconomic) shocks, such as the global financial crisis, that may affect all countries in the same way. Last but not least, PVARs can be effectively employed with relative short–time series due to the efficiency gained from the cross–sectional dimension.

The results of this study cannot support the existence of a tourism–led economic growth relationship in none of the clusters. Rather, the findings mainly manifest the economic–driven tourism growth hypothesis. More specifically, the latter hypothesis holds for countries with low standards of living, developing economies, low government effectiveness, non-democratic regimes and low tourism specialisation and tourism competitiveness. By contrast, countries characterised by high levels of economic performance, democratic regimes and high tourism quality do not show any long–term causalities. Such findings challenge the idea of tourism as a poverty alleviation driver and highlight the importance of the quality of both political institutions and tourism offer in identifying the relationship between tourism and economic growth.

The rest of this paper is structured as follows. Section 2 presents a review of the relevant literature. Section 3 describes the data and classifications used for this study, whereas section 4 presents the econometric approach. Section 5 reports the empirical results from our analysis and section 6 concludes the paper and outlines the policy implications.

2 Literature review

During the past decades, tourism studies exhibited a growing interest in the relationship between tourism and the wider economy. Relevant work sought to explore the causal direction of effects between a country's international tourism presence and its overall economic performance. In particular, they attempted to define whether tourism activity drives the growth of host economies or whether national economies prompt tourism expansion. The product of this extended line of enquiry is a mosaic of different, often opposing interpretations that render this area of research inconclusive and still open to discussion.

More specifically, there is a considerable number of studies which provide evidence of the existence of a unidirectional relationship, either from tourism to the economy – also known as the tourism–led economic growth (TLEG) hypothesis – or from the economy to tourism – the so–called economic–driven tourism growth (EDTG) hypothesis. Indicatively, the empirical work of Parrilla et al. (2007) in Spain, Schubert et al. (2011) in Antigua and Barbuda and Eeckels et al. (2012) in Greece advocate for the TLEG hypothesis, suggesting that the tourism specialisation of these countries enhances their overall growth rates. On the other hand, Payne and Mervar (2010) in Croatia, Tang (2011) in Malaysia and Chatziantoniou et al. (2013) in France hold that it is the economic growth of state economies that stimulates tourism development and not its antipode.

Apart from the unidirectional hypotheses, some scholars have found that the causal relationship between tourism and the economy can be of bilateral character running in both directions. For instance, the findings of Chen and Chiou-Wei (2009) in South Korea and Ridderstaat et al. (2014) in Aruba lend support to the bidirectional hypothesis, according to which there are mutual influences across the tourism–economy nexus. At the same time, there are occasions in which all the aforementioned propositions are rejected, as in the cases of Katircioglu (2009) in Turkey and Tang and Jang (2009) in the US where no causal links between the two factors can be confirmed. Furthermore, Antonakakis et al. (2015) find that the tourism-economic growth relationship is not stable over time; rather, it is very responsive to major economic events.

It is apparent that the existing literary work does not provide a single interpretation, which can describe the tourism–economy nexus comprehensively. It is also worth commenting that in their majority, relevant studies narrow their focus on specific case–study areas. However, researchers such as Lee and Chang (2008) and Dritsakis (2012) argue that a cross–sectional analysis of the tourism–economy dynamics allows for a more in–depth and comparative examination of different groups of countries. In addition, it is plausible to propose that the use of panel data can decrease endogeneity through the consideration of specific country effects, omitted variables, reverse causality and measurement error.

Indeed, there is an emerging strand of the literature which follows the panel data approach. Studies across this path of research most commonly group their countries according to their geographical proximity. For example, Narayan et al. (2010) explore four Pacific islands, whereas Dritsakis (2012) examines a selection of Mediterranean destinations. Using panel cointegration tests, both studies postulate the TLEG hypothesis. Further, Apergis and Payne (2012) choose to investigate nine Caribbean states where the panel error correction model reveals bi–causal links. Similarly, Lee and Brahmasrene (2013) employ both techniques for 27 European Union member countries confirming a positive effect of tourism on economic growth.

There are also some studies that use panel data comprising countries from all across the globe. Indicatively, Holzner (2011) examines 134 countries and observes that tourism impacts positively on national economies although not at a particularly high degree. Further, Ivanov and Webster (2013) consider the effect of globalisation on tourism's contribution to economic growth in 167 countries, concluding that globalisation plays no significant role.

The focus on a large number of countries has certain advantages, nevertheless sensitivity analysis, through the classification of countries into different groups, could provide a more in–depth insight on the tourism–growth relationship. In this respect, there are some papers that classify their sample countries based on specific criteria.

A characteristic example is the work of Lee and Chang (2008) who apart from a geographical classification (Asian, Latin American and Sub-Saharan African), they also divide their 55 sample countries into OECD and non–OECD members. The researchers report that the nature of the tourism–economic growth relationship demonstrates differences depending on their region or OECD membership. For example, there is a long–run TLEG causality for OECD countries, while for non–OECD countries this causality is bidirectional. The latter finding is also reported for Latin America and sub–Sahara Africa but no long–run relationship is confirmed for Asia.

Another case in point is that of Sequeira and M. Nunes (2008) who divide their case–study areas in small (based on demographics) and poor countries (based on per capital GDP) to investigate whether the effect of tourism on the economy is significantly higher for these clusters as compared to international average. They demonstrate that tourism specialisation is more crucial for poor countries; a case that does not hold for small ones. Similar studies that group countries based on the type of their economy are these of Seetanah (2011), who concentrates on a sample of island economies and reports bidirectional causality between tourism and economic growth, and Chou (2013), who narrows his enquiry down to transition economies using panel Granger causality tests, yet no clear pattern is revealed.

Apart from the aforementioned, researchers may employ alternative classifications to filter their enquiry of the tourism–economy relationship. For instance, Arezki et al. (2009) assess 127 countries, using as an indicator their tourism specialisation based on their number of UNESCO World Heritage Sites (WHS). They report that the latter increases the positive effects of tourism on economic growth. More interestingly, Chang et al. (2012) group 159 countries into two clusters (high and low regimes) for each of three classifications; their trade openness, their investment share to GDP and their share of government consumption to GDP. They find evidence that countries which belong to low regimes tend to exhibit a stronger TLEG relationship whereas economies at high regimes do not always enjoy significant tourism effects.

As encapsulated in the previous paragraphs, scholars have recently shown a strong interest in examining multiple countries rather than isolated cases. However, the vast majority of these studies either use no or a mere classification for sample countries, such as a geographic–based characteristic or an economic criterion. There are only but few attempts to introduce various classifications within the same study (as in the case of Chang et al., 2012). Furthermore, all papers that use panel data and/or country classifications select *a priori* a causal relationship, which could flow from either tourism or the economy. This paper aims to extend this strand of the literature by using a PVAR approach and analysing a complete set of six characteristics, which capture the three dimensions that influence the tourism–growth relationship (i.e. economic, political/governance and tourism product). The PVAR approach allows the data itself to reveal the actual causal direction, instead of *a priori* defining the nature of this relationship.

3 Data

In this study we collect annual data from the World Development Indicators database maintained by the World Bank for per capita international tourism receipts (ITRCPT), per capita tourism expenditures (ITEXP) and per capita tourist arrivals (ITARR), over the period 1995–2011 for 113 developed and developing countries (totalling 1921 observations). The use of three different proxies for tourism income was chosen for robustness purposes. However, for the sake of brevity, we present the findings that are based only on per capita international tourism receipts. The results from using per capita tourism expenditures and per capita tourist arrivals are qualitatively similar and available from the authors upon request.

Furthermore, we obtain annual data for real GDP per capita (in 2005 US$, GDPPC), level of development, government effectiveness (GOVEFF), polity IV index (POLREG), number of UNESCO WHS (TOURSPEC) and travel and tourism competitiveness index (TTCI), as criteria for our classifications of countries. Real GDP per capita and government effectiveness scores were obtained from the World Development Indicators database maintained by the World Bank. The classification of the countries between developed and developing follows the United Nations' classification. Data for the polity IV index are accessed through the Polity IV project website (www.systemicpeace.org/polity/polity4.htm). Finally, information on the number of UNESCO WHS is retrieved from UNESCO's website (whc.unesco.org/en/list), whereas data regarding the travel and tourism competitiveness index are acquired from the World Economic Forum (www.weforum.org/reports/travel-and-tourism-competitiveness-report-2013).

Based on the aforementioned data, we proceed with the classification of the 113 countries using the following criteria:

a. *Standards of living.* An economic feature of destinations such as their standard of living is among the factors that need to be taken into consideration. First, a high standard of living would normally imply high relative prices within the destination and the reverse (RodrõÂguez et al., 1998). Thus, tourism prices, shaped largely by the standard of living in one destination and compared to tourism prices/standard of living in alternative destinations can influence affordability and destination choice (Song and Wong, 2003). On this premise, it is interesting to investigate whether they also influence tourism success in stimulating the economy. Second, destinations standard of living can be improved by the tourism industry over time (Saveriades, 2000; Tosun, 2002). This means that we need to examine whether changes in the standard of living affect tourism-economy interdependencies. Given that GDP is one of the measures that reflects standards of living, we classify countries into three distinct groups based on their GDP per capita. Figure 1 demonstrates countries classification from the lower standards of living to the highest, moving from cluster 1 to 3. We have also considered the income group classification of the World Bank and the results are qualitatively similar. However, for brevity we do not report these results here but they are available upon request.

[Insert Figure 1 around here]

b. *Level of development.* We distinguish between developed and developing countries to assess whether any differences exist between the way that tourism affects their economies. This is a particularly current issue given that tourism is often presented as a driver for poverty alleviation (see, for instance, UNWTO and SNV, 2010). For this to hold, we would expect a TLEG relationship in developing economies. In fact, the study of the tourism–economy relationship in the context of developing countries has attracted some attention and was not always backed up by empirical evidence (see, inter alia Ekanayake and Long, 2012). Thus, it is considered valuable to also use this clustering and try to shed some more light on this critical question. Table 1 provides a list of developed and developing countries.

[Insert Table 1 around here]

c. *Government effectiveness.* We consider some additional parameters, such as a country's level of bureaucracy, given that this can also influence the success of its tourism product. One salient example is the ease of issuing a visa, which is proven to encourage visitation decisions (Cheng, 2012). Further, government–led administrative tasks which support tourism operations – such as infrastructure provision – can influence the impact that the sector has on the national economy. Similarly, taxes levied on tourists and tourism–related businesses need to be redistributed efficiently in order to make a positive impact (Gooroochurn and Sinclair, 2005). Overall, governments play a central role in tourism as they provide the regulations for tourism planning and management and thus, it is plausible to take their effectiveness into account. Figure 2 illustrates the classification of our sample countries according to this criterion. The level of effectiveness increases as we move from cluster 1 to 3.

[Insert Figure 2 around here]

d. *Political regime.* We distinguish countries based on their level of democracy. According to the literature, we argue that more democratic countries exhibit higher political stability (see, e.g. Dutt and Mobarak, 2015), which in turn encourages economic development and tourism activity (see, e.g. Farmaki et al., 2015). Interestingly, there is evidence that extended political unrest, as compared to one-off short-term political incidents, has remarkably more devastating results for tourism (Fletcher and Morakabati, 2008). Thus, it makes sense to assume that long-term political turbulence can severely hit tourism and the economy as a whole. Figure 3 presents this grouping of countries, based on the polity IV index, where cluster 1 denotes authoritarian or hybrid regimes (i.e. a mix of anocratic and autocratic regimes), 2 refers to relatively high democracy and 3 to full democracy.

[Insert Figure 3 around here]

e. *Level of tourism specialisation.* We group countries based on their number of UNESCO WHS, with the more WHS to reflect more specialised destinations, similarly to Arezki et al. (2009). The WHS list may include monuments, groups of buildings, forests, lakes, mountains and other areas of special cultural and/or physical significance (UNESCO, 1972). It is a list with international geographic coverage, recognised by 191 countries. As argued by Arezki et al. (2009) and Yang et al. (2010), the existence of a high number of sites ascribed with the UNESCO status is likely to affect growth through tourism activity. Indeed, the WHS list has been evolved into a strong marketing tool for tourism, although some researchers have recently raised their doubts with regards to the WHS fostering effect on tourism and economic growth (see, for instance, Cellini, 2011; Huang et al., 2012). Figure 4 demonstrates this classification, with cluster 1 being the countries with the lowest and 3 the countries with the highest levels of tourism specialisation.

[Insert Figure 4 around here]

f. *Tourism competitiveness.* We adopt the travel and tourism competitiveness index that combines some of the aforementioned characteristics. More specifically, TTCI is constructed on the basis of policy rules and regulations, which relate to our government effectiveness and political regime criteria here, price competitiveness, as well as, cultural resources, which is represented by the tourism specialisation number of WHS factor we employ. Thus, the tourism competitiveness clustering will also allow us to compare and corroborate our TTCI results with the results of individual criteria. Table 2 provides the list of countries based on this categorisation, with cluster 1 being the countries with the lowest and 3 the countries with the highest levels of tourism competitiveness.

[Insert Table 2 around here]

Descriptive statistics of each variable and across country groups are presented in Tables 3 and 4.

[Insert Tables 3 and 4 around here]

From Table 3 we notice the significantly higher income that the developed countries exhibit compared to the developing ones. Furthermore, we notice that developing countries experienced, on average, negative growth rates on their tourism proxies, whereas the reverse holds true for the developed countries (although, a marginal negative growth on ITARRGR is observed on the developed countries). Another interesting observation from Table 3 is the fact that there are no noticeable differences in their ITEXP. More importantly, Table 4 suggests that different clusters exhibit different economic and tourism growth patterns, deeming important the analysis of the tourism-growth nexus in a cluster approach.

3.1 Clustering approach

The classification of countries in the aforementioned 3 clusters for the standards of living, government effectiveness, political regime, level of tourism specialisation and tourism competitiveness is based on the k-means clustering method (the level of development criterion has only 2 clusters and these are given by the United Nations). The k-means clustering approach aims to partition n observations (in our case countries) into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. The clustering was performed in R using the Hartigan and Wong (1979) algorithm.

Specifically, given a set of observations $(x_1, x_2, ..., x - n)$, where each observation is a d-dimensional real vector, k-means clustering aims to partition the n observations into $k(n)$ sets $\mathbf{S} = \{S1, S2, ..., Sk\}$ so as to minimize the within-cluster sum of squares (WCSS). In other words, its objective is to find:

$$\arg\min_{S} \sum_{i=1}^{k} \sum_{xS_i} |||x - \mu_i|||^2 \tag{1}$$

where μ_i is the mean of points in S_i.

Our results presented here are based on $k(n)$=3 set, since this number resulted in an ample amount of countries (and therefore observations to perform our analysis) in each set/cluster. The details of the relevant clusters, in terms of minimum and maximum values, as well as, cluster centers are shown in Table 7.

[Insert Table 7 here]

We should emphasize that these results remain robust to alternative values of sets/clusters, such as 2 or 4. The latter results are available upon request.

3.2 Panel unit root tests

The first step for the investigation of causality is to determine whether the series has any integration orders. For this purpose, this study employs panel unit root tests developed by Levin et al. (2002) (hereafter LLC) and Im et al. (2003) (hereafter IPS).

The LLC (2002) unit root test considers the following panel ADF specification:

$$\Delta \ln Y_{it} = \rho_i Y_{it-1} + \sum_{j=1}^{p_i} \delta_{i,j} \Delta \ln Y_{it-j} + \varepsilon_{it}, \tag{2}$$

where Y_{it} is a vector of our key endogenous variables: tourism income per capita growth and real GDP per capita growth.

The LLC (2002) assumes that the persistence parameters ρ_i are identical across cross-sections (i.e., $\rho_i = \rho$ for all i), whereas the lag order p_i may freely vary. This procedure tests the null hypothesis $\rho_i = 0$ for all i against the alternative hypothesis $\rho_i < 0$ for all i. Rejection of the null hypothesis indicates that the series are stationary

The IPS (2003) test, which is also based on Eq. (2), differs from the LLC test by assuming ρ_i to be heterogeneous across cross–sections. The IPS tests the null hypothesis that all panels have a unit root, H_0: $\rho_i = 0$, for all i against the alternative hypothesis that a fraction, N_1), of all panels, N, that are stationary is nonzero, H_1: $\rho_i < 0$ for $i = 1, ..., N_1$. Specifically, if we let N_1 denote the number of stationary panels, then the fraction N_1/N tends to a nonzero fraction as N tends to infinity. This allows some (but not all) of the panels to possess unit roots under the alternative hypothesis.

The LLC and IPS tests were executed on data both in levels and first differences of the natural logarithms, and results were reported in Table 5. It is evident that all variables are stationary in first differences, while the level results indicate the presence of a unit root in general.

[Insert Table 5 here]

3.3 Panel Granger–causality

Next we examine the direction of causality among GDP per capita growth and tourism income per capita growth in a panel context. The Granger causality test is as follows:

$$\begin{aligned} \Delta \ln g_{it} &= \alpha_{1t} + \sum_{l=1}^{mlg_i} \beta_{1i,l} \Delta \ln g_{it-l} + \sum_{l=1}^{mlti_i} \gamma_{1i,l} \Delta \ln ti_{it-l} + \varepsilon_{1it} \\ \Delta \ln ti_{it} &= \alpha_{2t} + \sum_{l=1}^{mlg_i} \beta_{2i,l} \Delta \ln g_{it-l} + \sum_{l=1}^{mlti_i} \gamma_{2i,l} \Delta \ln ti_{it-l} + \varepsilon_{2it}, \end{aligned} \quad (3)$$

where index i refers to the country, t to the time period ($t = 1, ..., T$) and l to the lag. $\Delta \ln g$ denotes the real GDP per capita growth, $\Delta \ln ti$ denotes tourism income per capita growth (as this is approximated by tourism receipts, tourism expenditures and tourist arrivals), and ε_{1it} and ε_{2it} are supposed to be white-noise errors.

For instance, according to model (3), in country group i there is Granger causality running only from ti to g if in the first equation not all γ_{1i}'s are zero but all β_{1i}'s are zero. The Chi^2 statistic tests the null of no causal relationship for any of the cross-section units, against the alternative hypothesis that causal relationships occur for at least one subgroup of the panel. Rejection of the null hypothesis indicates, for example, that ti Granger causes g for all i.

The results of the panel Granger-causality test are reported in Table 6.

[Insert Table 6 here]

According to these results, some interesting patterns are revealed. In particular, it is evident that economic growth primarily drives tourism growth and this is a first indication that possibly it is the EDTG that prevails. Nevertheless, there are cases (such as in the GOVEFF3 and TOURSPEC3 clusters), where a bidirectional causality is demonstrated, suggesting that in countries with greater government effectiveness and tourism specialisation there is a feedback effect between the two variables. In addition, a TLEG relationship is reported in the case of STANLIV3 cluster. Overall, the inference that we draw from this preliminary analysis is that the choice of different criteria and clusters adds value to the discussion of the tourism–growth relationship, given that heterogeneous behaviour is observed. Although the economic growth is the prevailing driver, there is evidence of heterogeneity among the Granger causality test in many of the country groups, which motivates the use of generalised forecast error variance decomposition in our impulse response analysis (for more details, please refer to the next section).

4 Empirical methodology

4.1 Panel VAR approach

The PVAR methodology combines the traditional VAR approach, which treats all the variables in the system as endogenous, with the panel-data approach, which allows for unobserved individual heterogeneity. In its general form, our model can be written as follows:

$$\Delta \ln Y_{it} = A_0 + A_1 \Delta \ln Y_{it-j} + A_2 X_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{4}$$

where Y_{it} is a vector of our key variables: tourism income and economic growth. The autoregressive structure allows all endogenous variables to enter the model with a number of j lags. The number of lags is determined with the use of the Akaike Information Criterion (AIC) and the Schwarz Bayesian Information Criterion (BIC). X_{it} is a vector of the exogenous variables, which are used as control variables, comprising: (i) labour force participation rate, capturing labour input, (ii) gross fixed capital formation as a % of GDP, measuring capital input, and (iii) imports plus exports over GDP, capturing the degree of openness. The data for the exogenous variables have been obtained from the World Development Indicators database.

The advantage of the PVAR is the same as the advantage of any panel approach; i.e., it allows for the explicit inclusion of a fixed effect in the model, denoted μ_i, which captures all unobservable time–invariant factors at a country level. This is important for our purposes as the inclusion of these fixed effects allows each country to have a country specific level of each of the factors in the model, and, in addition, to capture other time-invariant factors, such as country size and number of heritage sites. However, inclusion of fixed effects presents an estimation challenge, which arises in any model which includes lags of the dependent variables: the fixed effects are correlated with the regressors and, therefore, the mean–differencing procedure commonly used to eliminate fixed effects would create biased coefficients.

To avoid this problem we use forward mean-differencing, also referred to as the 'Helmert procedure' (Arellano and Bover, 1995). This procedure removes only the forward mean, i.e., the mean of all the future observations available for each country-year. This transformation preserves the orthogonality between transformed variables and lagged regressors, which allows us to use lagged regressors as instruments and estimate the coefficients by system GMM. In our case the model will be just identified because the number of regressors will equal the number of instruments; therefore, system GMM is numerically equivalent to equation-by-equation 2SLS. Our PVAR estimation routine follows Love and Zicchino (2006) and Love and Rima (2014).

Another benefit of the panel data is that allows for common time effects, λ_t, which are added to model (4) to capture any global (macroeconomic) shocks that may affect all countries in the same way. For example, time effects capture common factors such as the global financial crisis and other global risk factors. To deal with the time effects, we time difference all the variables prior to inclusion in the model, which is equivalent to putting time dummies in the system.

Model 4 above is commonly referred to as reduced form, in a sense that each equation only contains lagged values of all other variables in the system. The prime benefit of the VAR system is that allows the evaluation of the effect of the orthogonal shocks i.e., the impact of a shock of one variable on another variable, while keeping all other variables constant. This is accomplished with the use of impulse-response functions, which identify the reaction of one variable to the innovations in another variable in the system, while holding all other shocks equal to zero. However, since (i) the actual variance-covariance matrix of the errors is unlikely to be diagonal (e.g. errors are correlated), (ii) the results of the panel Granger causality tests revealed heterogeneous results among our variables/clusters and (iii) given that any particular ordering of the variables in our PVAR model would be hard to justify, we use the generalised PVAR framework (in the spirit of Koop et al., 1996; Pesaran and Shin, 1998), in which forecast error variance decompositions are invariant to the ordering of the variables.

To analyze the impulse–response functions, and to evaluate their statistical significance we estimate their confidence intervals. Since the matrix of impulse-response functions is constructed from the estimated VAR coefficients, their standard errors need to be taken into account. We generate the confidence intervals for the generalised impulse responses using Monte Carlo simulations.

5 Empirical findings

We begin our analysis with the full sample results as these are illustrated in Figure 5 (the number of lags for the VAR models is 5). Our analysis is based on international tourism receipts as a proxy for tourism growth.

[Insert Figure 5 around here]

We observe that although there is a bidirectional relationship between the tourism industry and economic growth during the first four years, the relationship subsequently turns into economy-driven. Thus, for the full sample estimation our results mainly coincide with the EDTG hypothesis, which implies that it is the economic performance of the sample countries that drives their tourism sectors. Nevertheless, the consideration of the full sample can only lead us to drawing some tentative conclusions, as the special qualities of our sample countries remain unmasked. Therefore, it would be interesting to isolate their particular characteristics and examine each ones effect on the tourism-economy relationship.

Initially, we divide our full sample of countries on the basis of their standards of living and the results are presented in Figure 6.

[Insert Figure 6 around here]

We observe that destinations with the lowest standards of living (Standards of Living cluster 1) confirm the EDTG. This is perhaps surprising given that we would expect that the countries with low living standards, which are mainly the less developed ones, would be more responsive to export activity. Yet, this can be explained by the structure of the tourism industry in these destinations i.e. the number of outsiders and the high level of leakages of tourism income from their local economies.

As Perez and Juaneda (2000) explain, package deals contract out mass tourism destinations, meaning that visitors purchase their transport–accommodation package at home. This inevitably confines spending at destinations to pocket money payments and decreases tourism income considerably. The fact though that the economy drives the tourism sector in these countries can be potentially explained by the fact that weaker economies have limited ability to exploit their resources or develop their infrastructure in order to support their home industries, including tourism.

In destination countries with high standard of living (cluster 3) we report an extremely short-lived bidirectional relationship. However, after two years we observe that there is no effect neither from tourism to the economy nor the reverse. Nonetheless, it is reasonable to argue that high living standards are mostly found in mature economies where tourism is a peripheral and not a core economic activity. For example, the tourism sector in the US has a total contribution of about 8% of the national income, as estimated by the World Travel and Tourism Council.

In contrast, in countries with moderate standards of living, we observe a clear bidirectional relationship. It should be underlined that a considerable number of the countries that comprise this cluster have popular tourism products (e.g. Croatia, Cyprus, Malta, Portugal and Spain) and tourism is an important industry for their economies. In particular, according to the World Travel and Tourism Council, the tourism industry in Croatia contributes 28.3% of its GDP, in Malta 28.1%, in Cyprus 21.3%, in Portugal 16.4% and in Spain 15.2%.

Overall, the results imply that the relationship between tourism and economic growth is influenced by the standards of living. We need to highlight here that part of this analysis is predicated upon the assumption that low living standards countries are also less developed and less competitive in tourism. Indeed, these assumptions are validated by the results obtained for the different levels of development and tourism competitiveness, which follow.

Our second classification is based on countries level of development. In this case, we have two sub–groups, namely developed and developing countries (see Figure 7).

[Insert Figure 7 around here]

For developed countries, we observe a short–lived bidirectional relationship, which fades out in the long run. In essence, we do not find evidence of any strong relationship between tourism and economic growth for this cluster of countries. Furthermore, in developing countries, we see again a short-lived bidirectional relationship; however, and in contrast to developed countries, this turns into an EDTG relationship, given that the responses of tourism receipts to economic growth shocks are persistent. Our finding does not offer support to the argument that the contribution of tourism to economic growth is greater for developing countries than it is for the developed ones (see Dritsakis, 2012).

Next, Figure 8 exhibits our findings with regards to government effectiveness.

[Insert Figure 8 around here]

Interestingly, we observe that in the two extremes, i.e. high and low levels of bureaucracy (cluster 3 and 1, respectively) the relationship between tourism and the economy in the first couple of years is bidirectional and thence turns into economic–driven. High levels of bureaucracy hinder economic activities and may exert a negative influence on various economic sectors, including tourism. Similarly, when the levels of bureaucracy are low, economic activity and investment are encouraged and facilitated by the state and thus, it makes sense to promote tourism activity as well. Further, when government effectiveness is medium the relationship remains bidirectional throughout the whole study period.

As far as the influences of political regimes on the tourism-economy relationship are concerned, these are illustrated in Figure 9.

[Insert Figure 9 around here]

As can be seen in Figure 9, an EDTG relationship is witnessed in countries with authoritarian or hybrid regimes (cluster 1). The interpretation of such finding is twofold; first, it can be argued that in many instances authoritarian practices create a turbulent environment for economic activities and hence, for all economic sectors including tourism. This incurs in non-democratic regimes as governments often employ a rent-seeking behaviour to gain political support rather than providing public goods (Plümper and Martin, 2003).

Second, it has been established by the political economy literature that it is common for economies which lack democracy to be controlled by a single individual or a small group of individuals. Such power imbalances do not allow the economy to grow or to spread the benefits of economic activity across society due to corruption (de Vaal and Ebben, 2011; Drury et al., 2006; Mo, 2001). Thus, we maintain that the way that the economy is controlled in non–democratic states influences tourism growth.

In contrast, the clusters of countries with "flawed" democracy (cluster 2) or full democracy (cluster 3) exhibit a bidirectional relationship, although this is short-lived for cluster 3. It is suggested that countries with either "flawed" or full democratic regimes are able to exploit the maximum capacity of their economies and consequently, are at a good position to support investment in their various sectors. Moreover, given that the benefits from each sector can be shared more fairly across society it is reasonable to argue that sectoral performance (in our case, tourism) could assist economic growth.

When considering tourism specialisation, defined as the number of WHS, we discern that regions of high or medium specialisation exhibit zero relationship between tourism and economic growth for most of our study frame, apart from the first few years of the impulse response period where a bidirectional relationship is evident (see Figure 10). In contrast, when tourism specialisation is low the bidirectional causality is witnessed for a short time period whereas in consecutive years the economy maintains the lead in the transmission of effects.

[Insert Figure 10 around here]

Hence, it appears that tourism specialisation exerts a quasi-opposite effect on destinations, a phenomenon for which might lie various explanations. First, we need to take into account the fact that it is the countries themselves that need to develop the nomination proposals for any site in their territory. Consequently, an inclusion to the list requires the use of resources (for conducting the necessary studies) and a certain level of government effectiveness and collaboration for meeting the nomination criteria (i.e. presenting a holistic approach as required by UNESCO). Given this set of circumstances, it can be argued that it is often the more developed and government efficient countries, which tend to achieve the WHS status for a higher number of sites as compared to the less developed ones (for instance, there are 7 WHS in Egypt as compared to 41 and 40 sites in France and Germany, respectively).

Second, although WHS may also include places of natural significance, the vast majority of listed sites are of cultural character (i.e. 802 out of 1031). There are some destinations with a low level of tourism specialisation which tend to be less popular for their cultural offer and more famous for their exoticism (for instance, the Bahamas, Dominican Republic, Mauritius and Seychelles). The so-called sea-sun-sand tourism offer in these regions might stimulate some wider economic responses that are nonetheless short-lived, perhaps due to the low spending character of sea-sun-sand visitors (Taylor et al., 1993).

Third, some of the countries in the low specialisation cluster have a significantly less developed tourism sector or significant geopolitical turbulence, which explains the fact that tourism does not affect their economic growth significantly (for example, Angola, Kazakhstan and Sierra Leone).

Finally, when we take into account the tourism competitiveness index we observe that the results resemble those from the standards of living, political regime and tourism specialisation clusters (see Figure 11), which provides an additional robustness to our existing findings.

[Insert Figure 11 around here]

6 Summary and concluding remarks

This is a comprehensive study on the tourism-economic growth nexus across the globe that takes into account the key dynamics that influence tourism and broader economic performance.

Existing empirical evidence on the tourism-economic growth relationship has been inconclusive so far and has led to various, often contradictory, interpretations of their causal direction of effects. This might be the result of focusing on a single country or cluster of countries by using panel regression models. We suggest that panel regression can be rather problematic when addressing this question, as the existence of causal effects is considered given. In contrast, this study is the first that employs a PVAR approach, as well as PIRFs, to examine the economic growth–tourism nexus in such a comprehensive panel of countries, where the direction of effects is not *a priori* selected, but rather allows for simultaneous interaction among our main variables.

At the same time, this study seeks to evaluate the said relationship not by grouping countries based on a single characteristic but rather, by considering a set of six different criteria that influence the tourism-economy dynamics. Our broad sample of 113 counties allows us to make generalisations more securely, whereas the use of three different proxies for tourism growth i.e. international tourism receipts, tourist arrivals, and tourism expenditure, as percentages of GDP, adds to the robustness of our findings.

The results cannot confirm the existence of the tourism–led economic growth relationship but rather, they offer some support to the economic–driven tourism growth hypothesis. This hypothesis holds for countries with low standards of living, developing economies, low government effectiveness, non-democratic regimes and low tourism specialisation and tourism competitiveness. On the contrary, countries characterised by high levels of economic performance, full democratic regimes and high tourism quality do not show any long–term causalities. Interestingly, countries with moderate levels of living standards and governance, "flawed" democratic regimes and moderate levels of tourism specialisation and competitiveness exhibit a mutual causal relationship, although in some cases this does not endure in the long–run. Such findings challenge the idea of tourism as a poverty alleviation driver and highlight the importance of the quality of both political institutions and tourism offer in identifying the relationship between tourism and economic growth.

Based on this evidence, policy makers in developing and less tourism–competitive countries could either seek to restructure their tourism sector by decreasing tourism income leakages or place more emphasis on other sectors when designing policies for economic development. In addition, those developing countries with significant tourism activity could apply a safety net to their tourism industry with the view to isolate influences of the economy, in cases of negative economic shocks.

At the same time, highly competitive and mature economies can develop tourism policies, which would be independent from their economic activity, given the neutral relationship between tourism and economic growth. Those who should pay more attention to their tourism sector are the countries that exhibit bidirectional causalities i.e. countries with moderate standards of living, government efficiency and competitive levels, as there exists the potential for tourism to foster economic growth.

An interesting avenue for further research is to investigate the potential indirect relationship between tourism and economic growth with the use of PVAR models and multiple endogenous variables (such as employment or infrastructure). Finally, a similar clustering approach could be further used to evaluate cultural, market or even climate factors.

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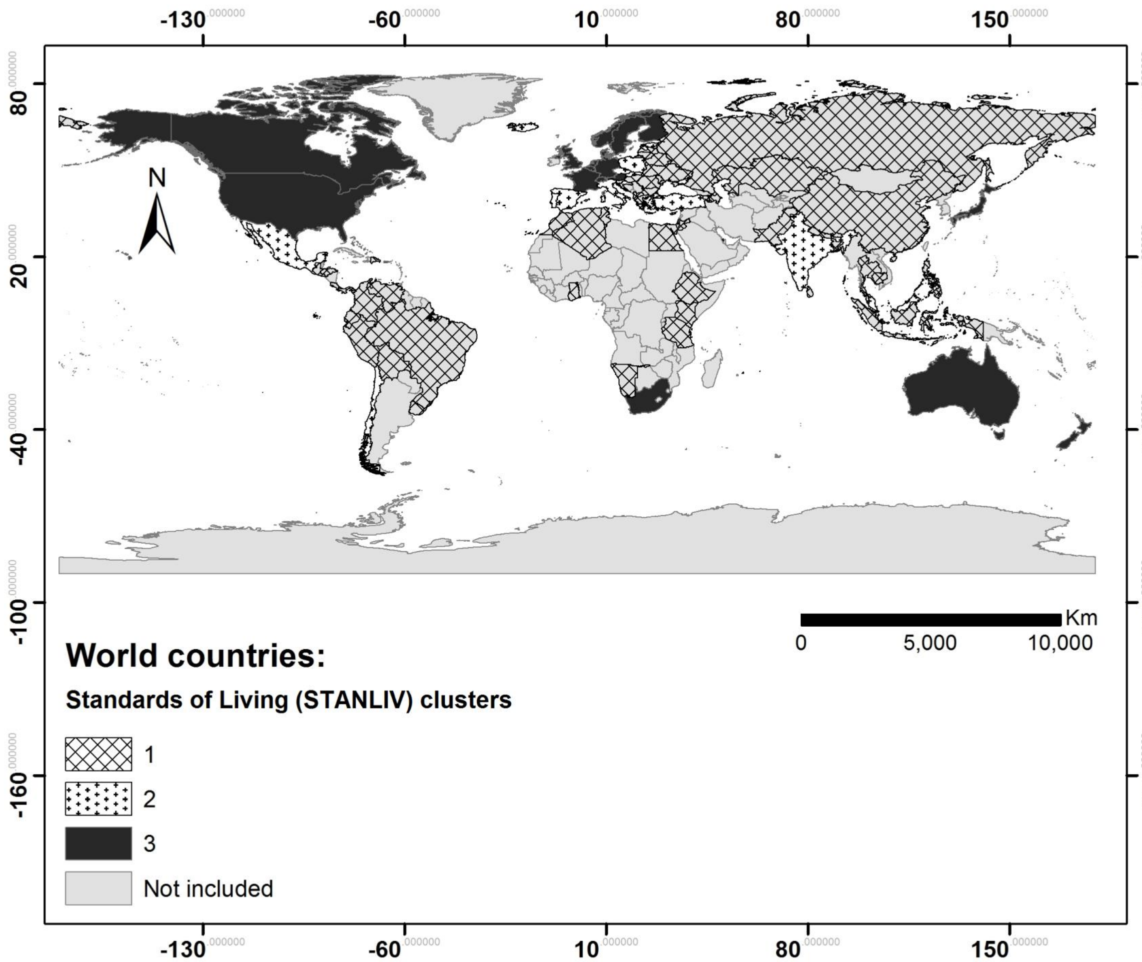
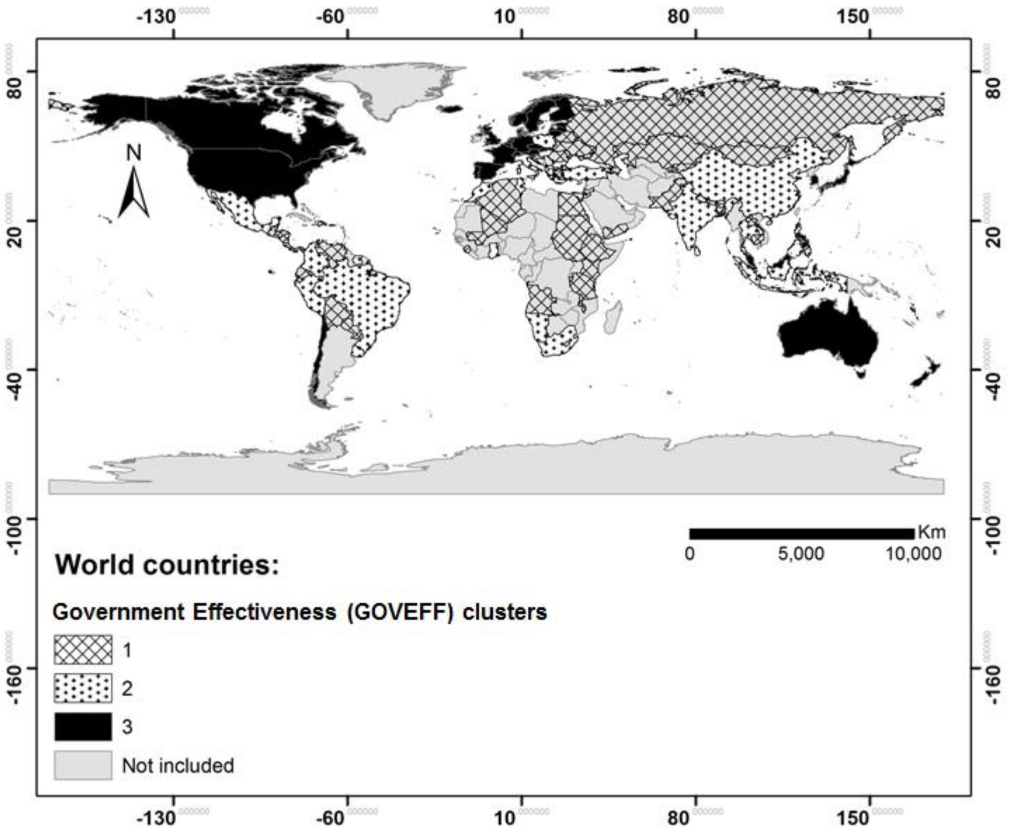
Figure 1: Standards of living classification



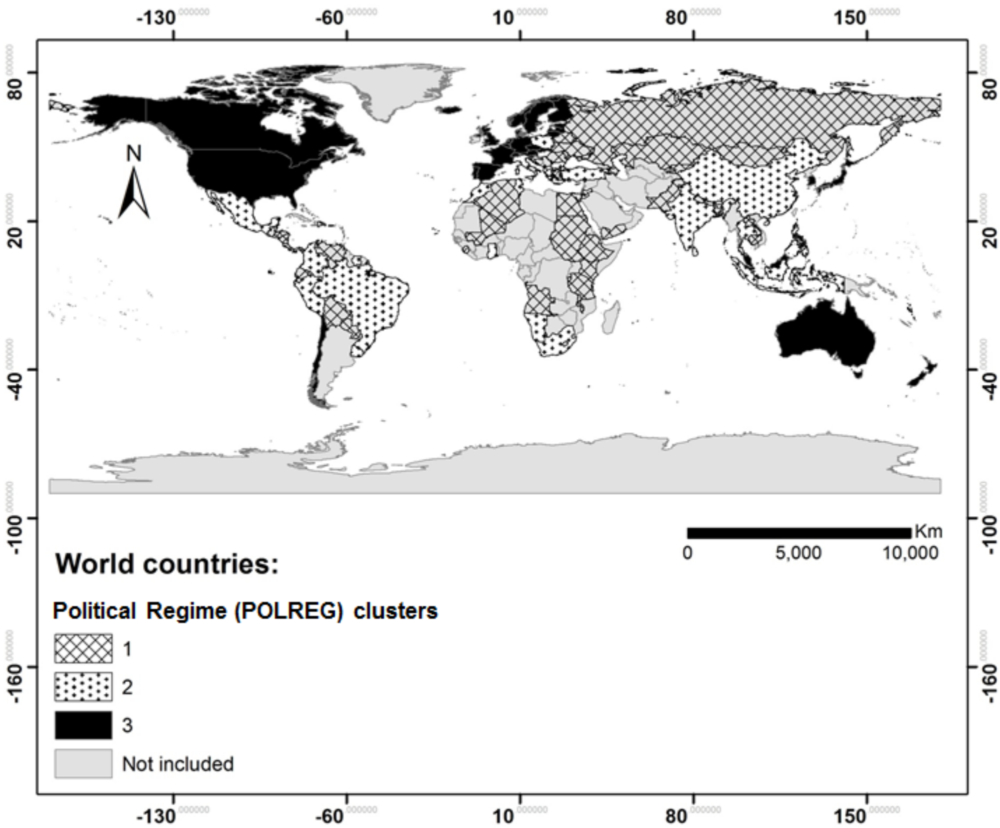
Note: Moving from cluster 1 to 3 this figure demonstrates coutries with the lowest to the highest standards of living. Clusters in this classification are denoted as STANLIV1, STANLIV2 and STANLIV3.

Figure 2: Government effectiveness classification



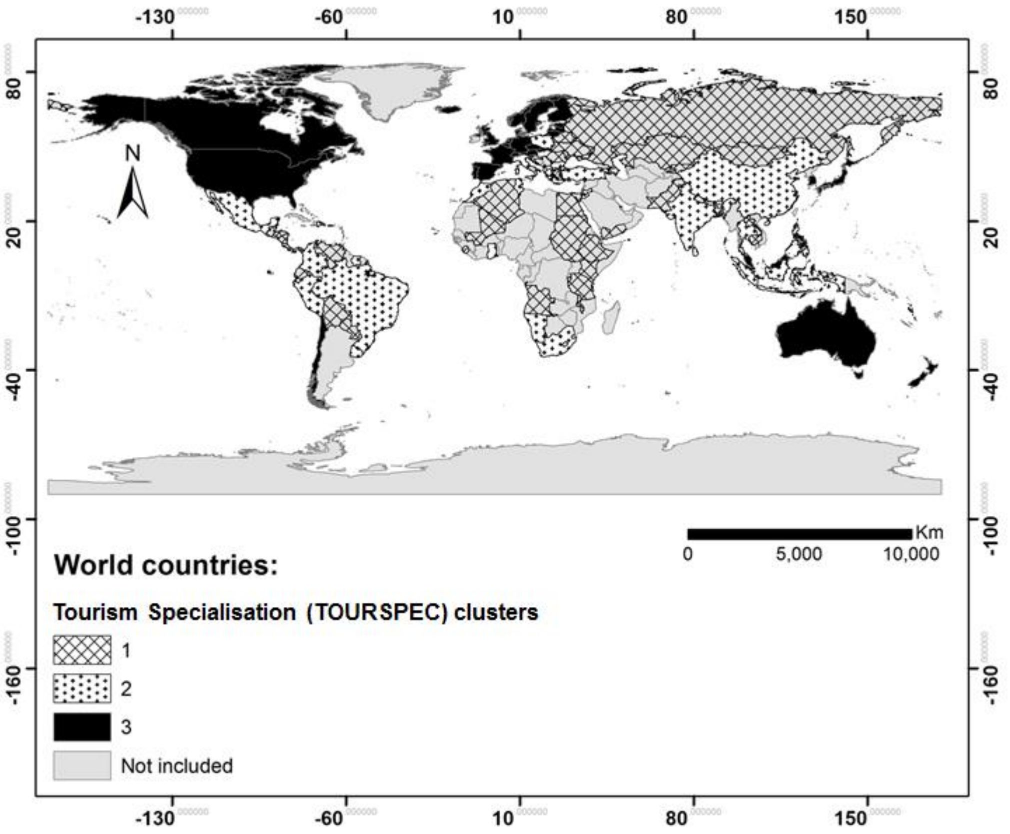
Note: Moving from cluster 1 to 3 this figure demonstrates the countries with the least government effectiveness to the most government effectiveness. Clusters in this classification are denoted as GOVEFF1, COVEFF2 and GOVEFF3.

Figure 3: Political regime classification



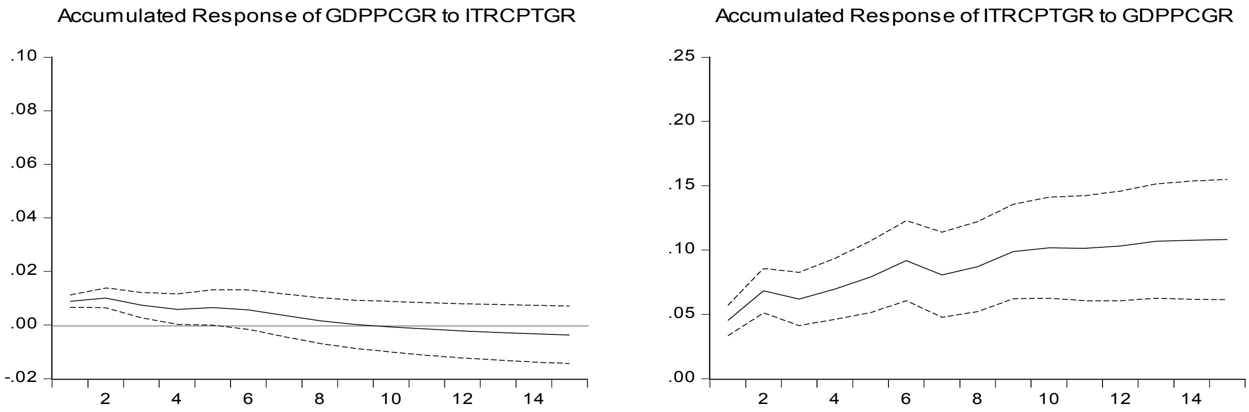
Note: Cluster 1 denotes authoritarian or hybrid regimes (i.e. a mix of democratic regimes with autocratic traits), 2 refers to democracy and 3 to full democracy. Clusters in this classification are denoted as POLREG1, POLREG2 and POLREG3.

Figure 4: Tourism specialisation classification



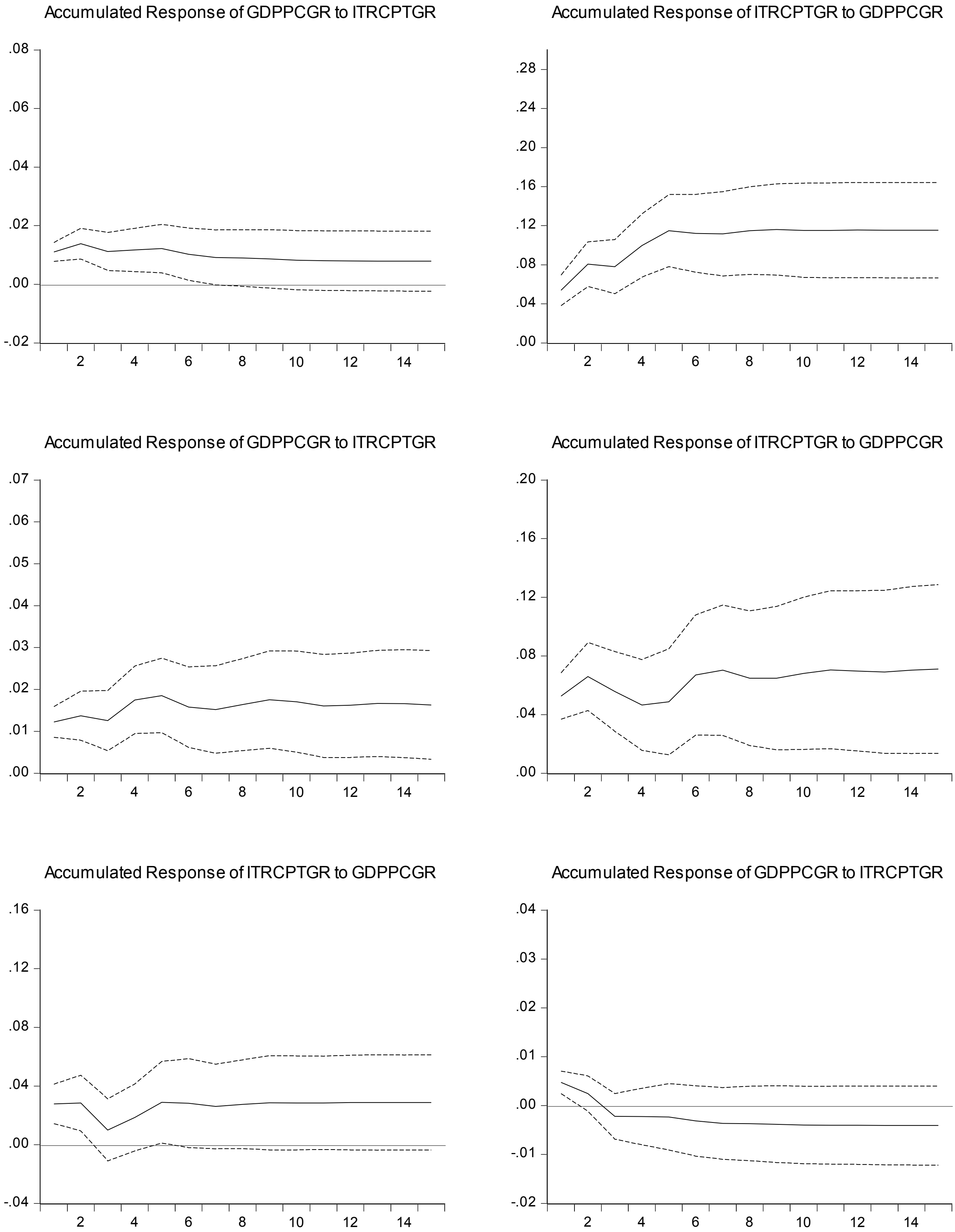
Note: Moving from cluster 1 to 3 this figure demonstrates countries from the lowest to the highest levels of tourism specialisation. Clusters in this classification are denoted as TOURSPEC1, TOURSPEC2 and TOURSPEC3.

Figure 5: Impulse responses based on the full sample estimation for the period 1995-2011



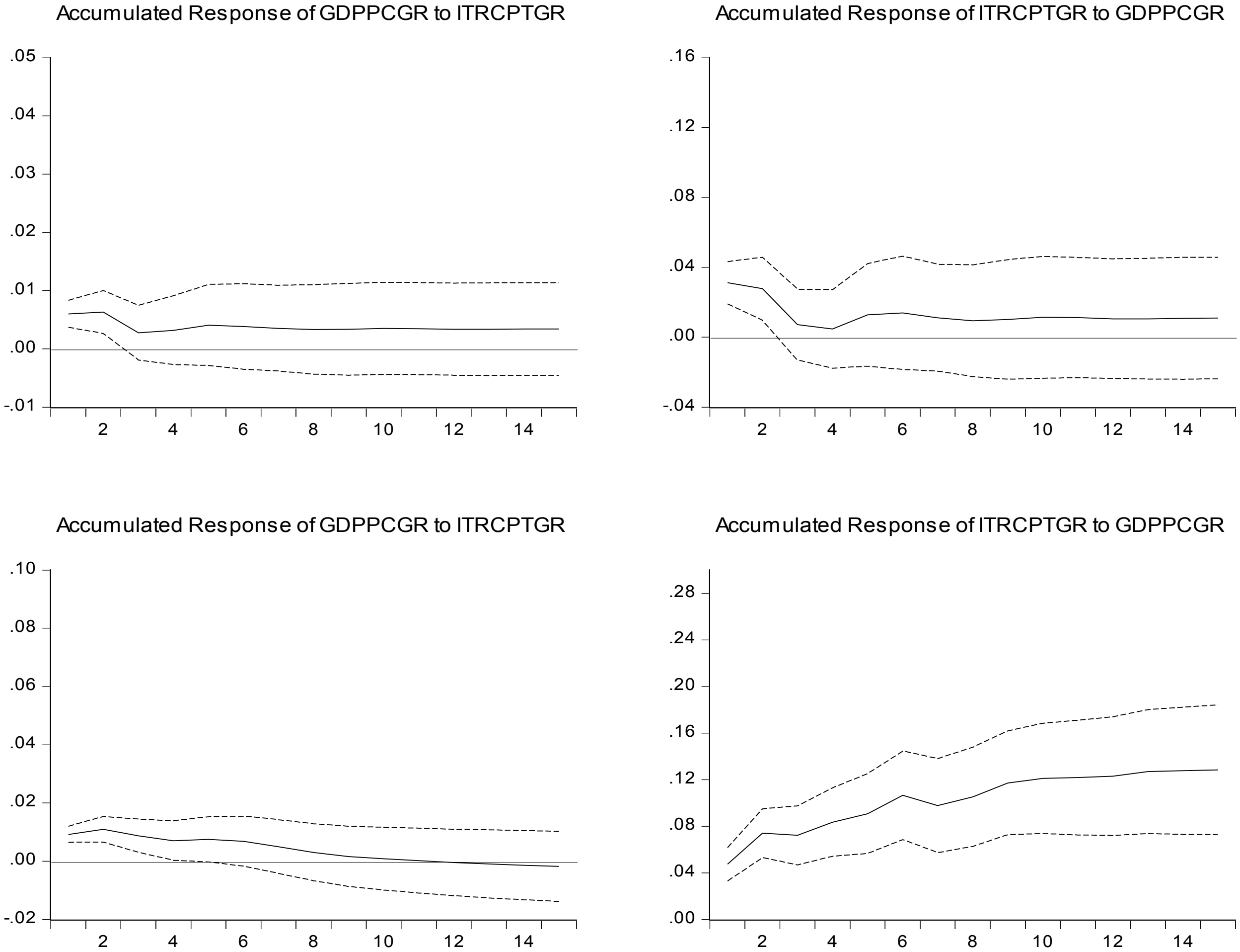
Note: *GDPPCGR* and *ITRCPTGR* denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 6: Impulse responses for the standards of living clusters estimation for the period 1995-2011



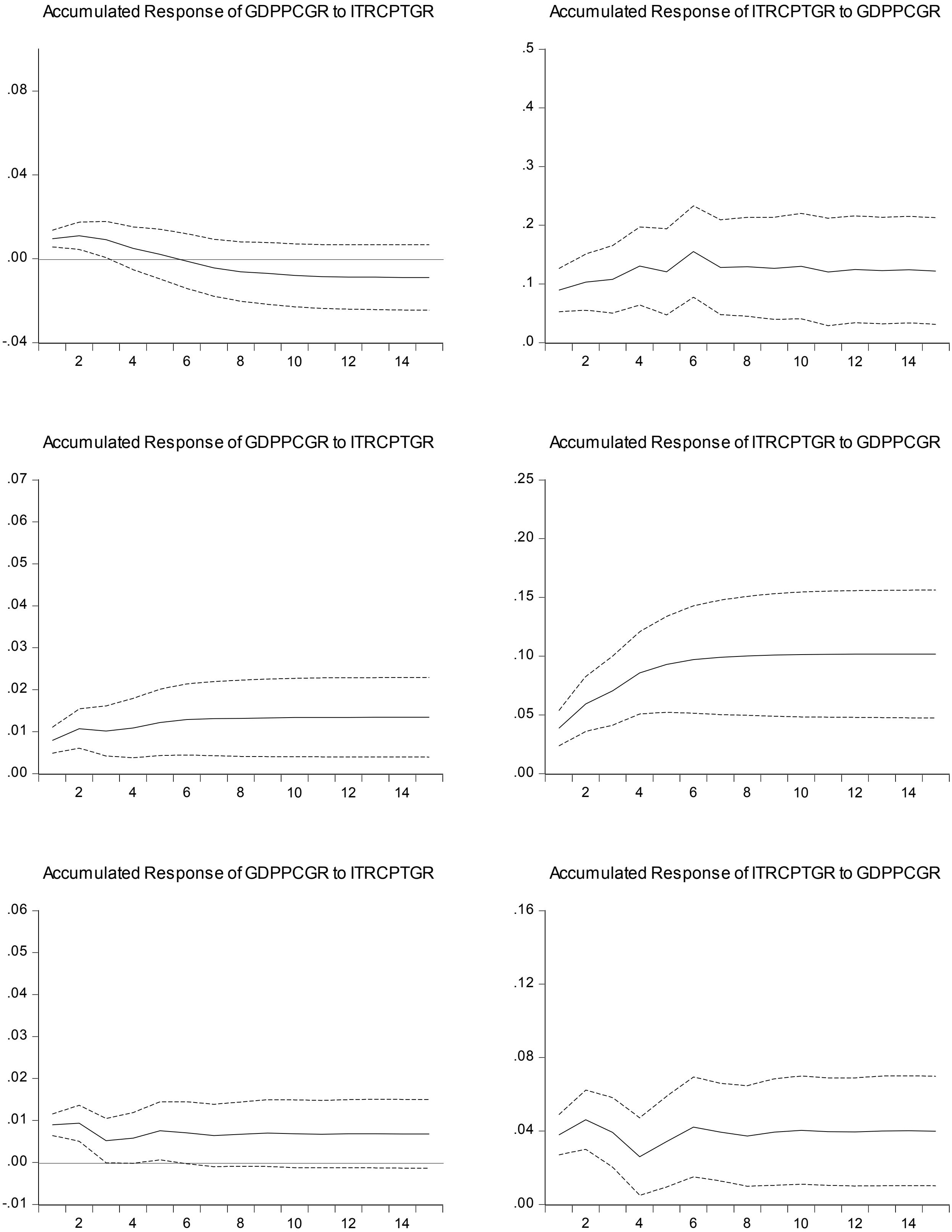
Note: Impulse responses for clusters STANLIV1, STANLIV2 and STANLIV3 are shown in the top, middle and lower panels, respectively. *GDPPCGR* and *ITRCPTGR* denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 7: Impulse responses for the level of development clusters estimation for the period 1995-2011



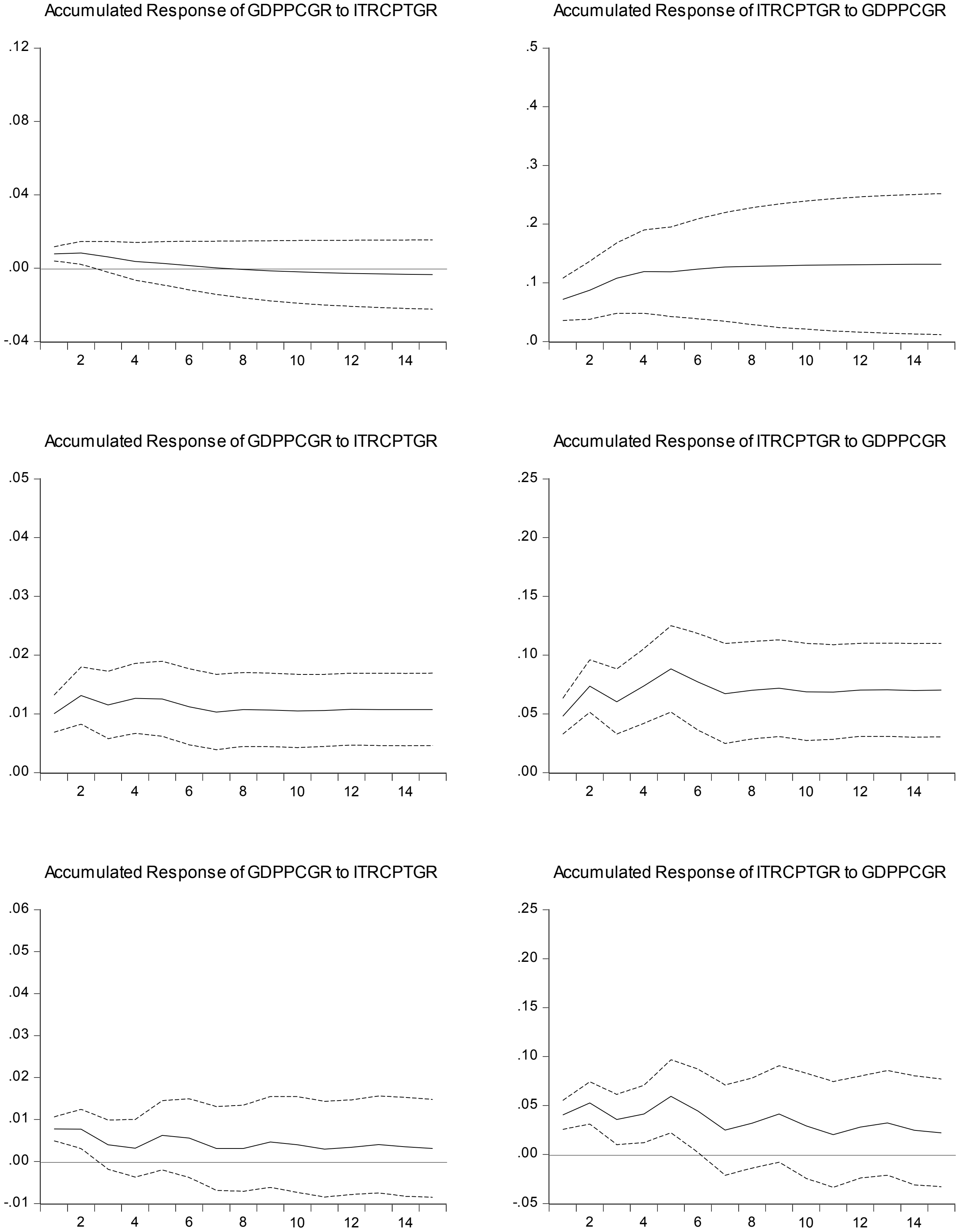
Note: Impulse responses for developed and developing countries are shown in the top and lower panels, respectively. $GDPPCGR$ and $ITRCPTGR$ denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 8: Impulse responses for the government effectiveness clusters estimation for the period 1995-2011



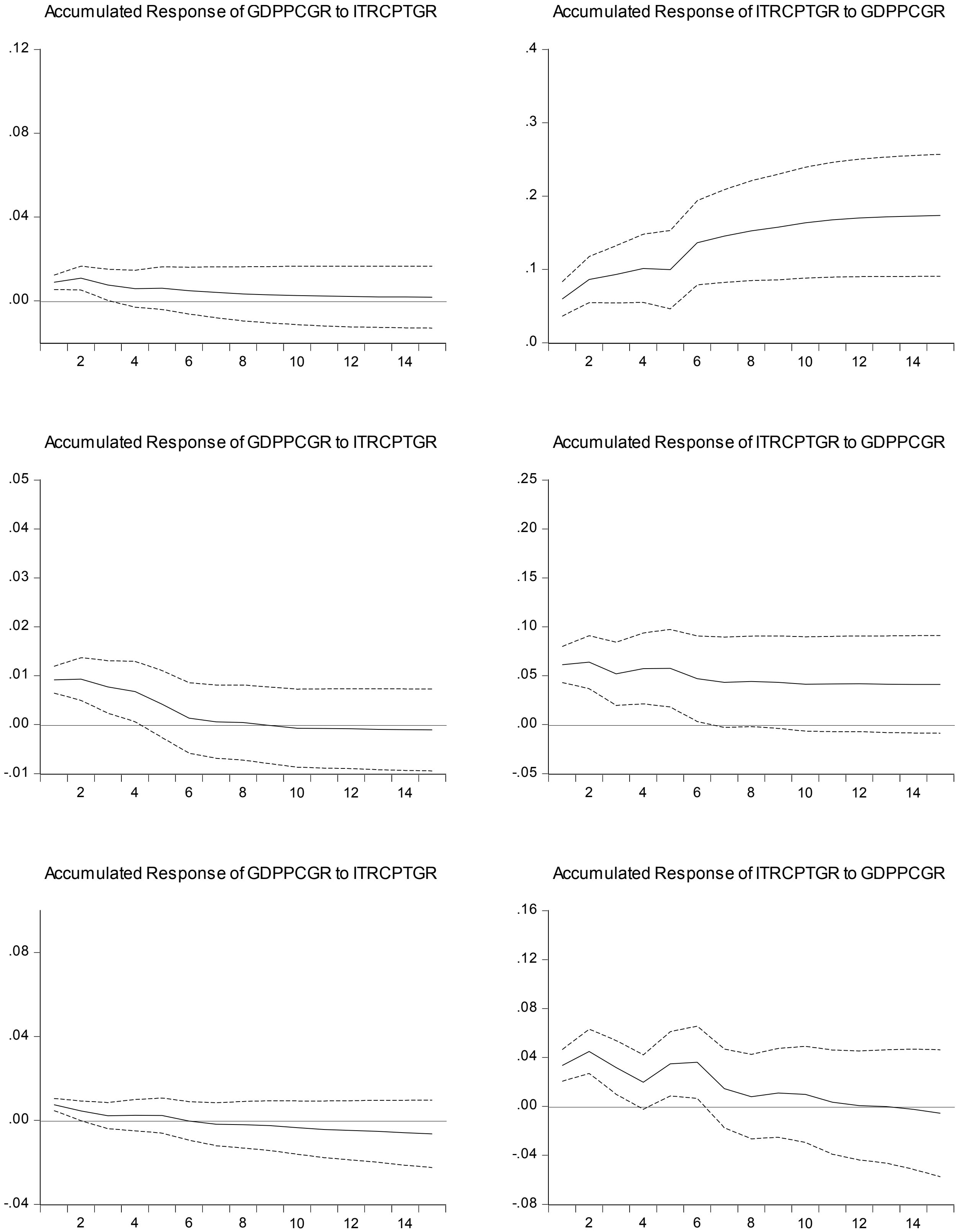
Note: Impulse responses for clusters GOVEFF1, GOVEFF2 and GOVEFF3 are shown in the top, middle and lower panels, respectively. *GDPPCGR* and *ITRCPTGR* denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 9: Impulse responses for the political regime clusters estimation for the period 1995-2011



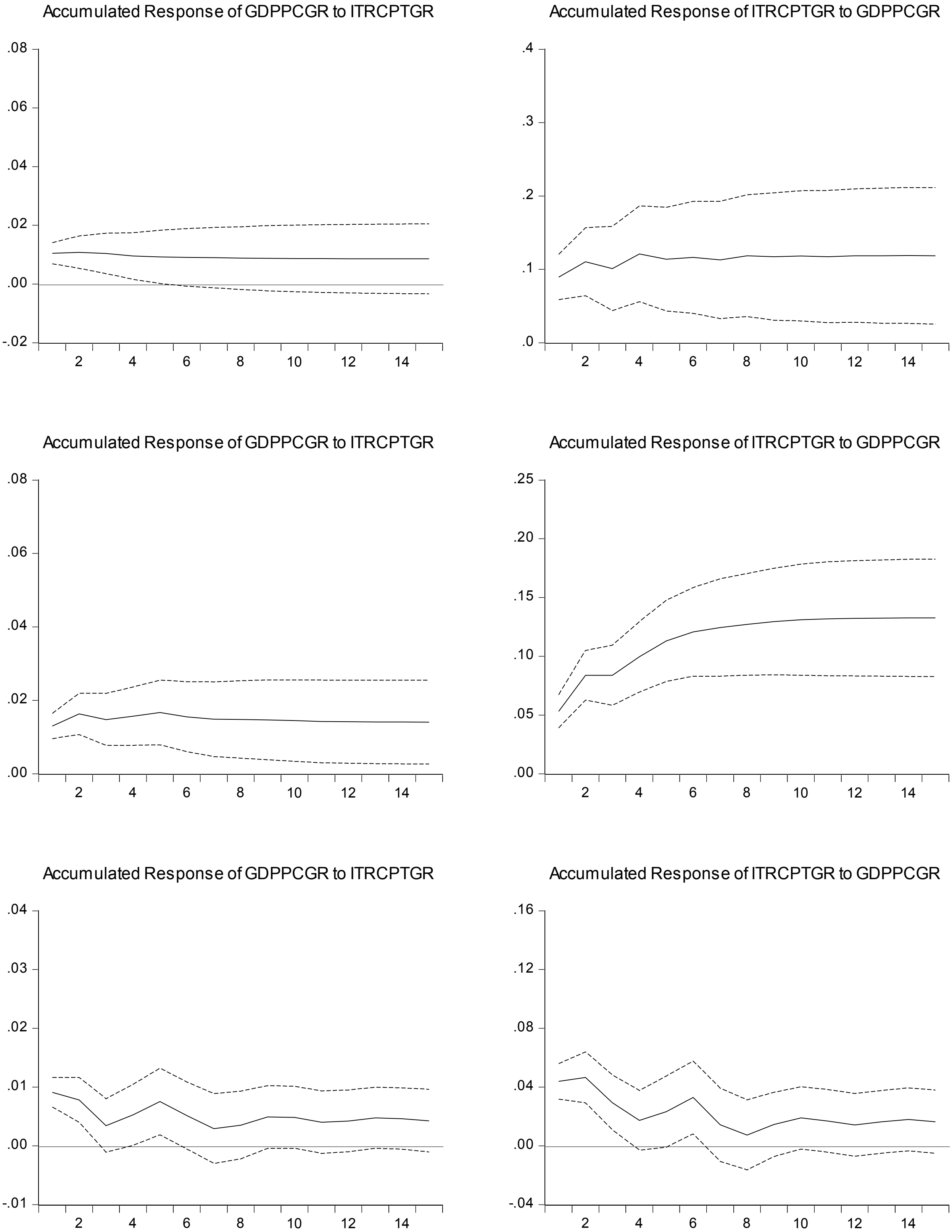
Note: Impulse responses for clusters POLREG1, POLREG2 and POLREG3 are shown in the top, middle and lower panels, respectively. $GDPPCGR$ and $ITRCPTGR$ denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 10: Impulse responses for the tourism specialisation clusters estimation for the period 1995-2011



Note: Impulse responses for clusters TOURSPEC1, TOURSPEC2 and TOURSPEC3 are shown in the top, middle and lower panels, respectively. $GDPPCGR$ and $ITRCPTGR$ denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Figure 11: Impulse responses for the tourism competitiveness clusters estimation for the period 1995-2011



Note: Impulse responses for clusters TTCI1, TTCI2 and TTCI3 are shown in the top, middle and lower panels, respectively. *GDPPCGR* and *ITRCPTGR* denote per capita real GDP growth and per capita international tourism receipts growth, respectively.

Table 1: Developed and developing countries

Developed Countries	Acronym	Developing Countries	Acronym
Australia	AUS	Albania	ALB
Austria	AUT	Algeria	DZA
Belgium	BEL	Angola	AGO
Canada	CAN	Antigua and Barbuda	ATG
Cyprus	CYP	Armenia	ARM
Denmark	DNK	Azerbaijan	AZE
Finland	FIN	Bahamas, The	BHS
France	FRA	Bahrain	BHR
Germany	DEU	Bangladesh	BGD
Greece	GRC	Belarus	BLR
Iceland	ISL	Belize	BLZ
Italy	ITA	Bolivia	BOL
Japan	JPN	Brazil	BRA
Luxembourg	LUX	Bulgaria	BGR
Malta	MLT	Burundi	BDI
Netherlands	NLD	Cambodia	KHM
New Zealand	NZL	Cape Verde	CPV
Norway	NOR	Chile	CHL
Portugal	PRT	China	CHN
Spain	ESP	Colombia	COL
Sweden	SWE	Costa Rica	CRI
Switzerland	CHE	Croatia	HRV
United Kingdom	GBR	Czech Republic	CZE
United States	USA	Dominica	DMA
		Dominican Republic	DOM
		Ecuador	ECU
		Egypt, Arab Rep.	EGY
		El Salvador	SLV
		Estonia	EST
		Ethiopia	ETH
		Ghana	GHA
		Guatemala	GTM
		Honduras	HND
		Hong Kong SAR, China	HKG
		Hungary	HUN
		India	IND
		Indonesia	IDN
		Israel	ISR
		Jordan	JOR
		Kazakhstan	KAZ
		Kenya	KEN
		Korea, Rep.	KOR
		Kyrgyz Republic	KGZ
		Lao PDR	LAO
		Latvia	LVA
		Lesotho	LSO
		Lithuania	LTU
		Macedonia, FYR	MKD
		Malawi	MWI
		Malaysia	MYS
		Mali	MLI
		Mauritius	MUS
		Mexico	MEX
		Moldova	MDA
		Mongolia	MNG
		Morocco	MAR
		Namibia	NAM
		Nepal	NPL
		Nicaragua	NIC
		Pakistan	PAK
		Panama	PAN
		Paraguay	PRY
		Peru	PER
		Philippines	PHL
		Poland	POL
		Puerto Rico	PRI
		Romania	ROM
		Russian Federation	RUS
		Seychelles	SYC
		Sierra Leone	SLE
		Singapore	SGP
		Slovak Republic	SVK
		Slovenia	SVN
		South Africa	ZAF
		Sri Lanka	LKA
		St. Kitts and Nevis	KNA
		St. Lucia	LCA
		St. Vincent and the Grenadines	VCT
		Sudan	SDN
		Suriname	SUR
		Tanzania	TZA
		Thailand	THA
		Tunisia	TUN
		Turkey	TUR
		Ukraine	UKR
		Uruguay	URY
		Vanuatu	VUT
		Venezuela, RB	VEN
		Yemen, Rep.	YEM

Notes: The classification of the countries follows the United Nations (http://www.un.org/en/development/desa/policy/wesp/wesp_current/2012country_class.pdf).

Table 2: Tourism competitiveness classification

Cluster 1	Cluster 2	Cluster 3
Burundi	Kazakhstan	Malaysia
Sierra Leone	Cape Verde	Greece
Lesotho	Dominican Republic	Czech Republic
Yemen	Egypt	Estonia
Algeria	Colombia	Cyprus
Mali	Ecuador	Italy
Malawi	Philippines	Korea, Rep.
Bangladesh	Armenia	Malta
Pakistan	Albania	Luxembourg
Ethiopia	Azerbaijan	Norway
Ghana	Macedonia, FYR	Denmark
Paraguay	Ukraine	Portugal
Venezuela	Sri Lanka	Belgium
Nepal	Peru	Finland
Kyrgyz Republic	Indonesia	Iceland
Bolivia	Morocco	Hong Kong SAR
Tanzania	Romania	Japan
Cambodia	India	Netherlands
El Salvador	South Africa	Australia
Moldova	Russian Federation	New Zealand
Mongolia	Jordan	Singapore
Suriname	Uruguay	Sweden
Guatemala	Mauritius	Canada
Kenya	Chile	France
Nicaragua	Bahrain	United States
Honduras	Slovak Republic	Spain
Namibia	Israel	United Kingdom
	Puerto Rico	Austria
	Brazil	Germany
	Bulgaria	Switzerland
	Lithuania	
	Latvia	
	Costa Rica	
	Turkey	
	China	
	Mexico	
	Poland	
	Thailand	
	Hungary	
	Seychelles	
	Panama	
	Slovenia	
	Croatia	

Notes: Moving from cluster 1 to 3 this table presents the countries with the lowest to the highest levels of tourism competitiveness. Clusters in this classification are denoted as TTCI1, TTCI2 and TTCI3.

Table 3: Descriptive Statistics - Full sample & by level of development

	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
All (113) countries								
GDPPC	11494.08	87716.7	125.267	15058.36	1.805935	6.176781	1851.967*	1921
ITARR	0.899331	103.5508	0.001305	2.757344	27.56917	1004.059	80454658*	1921
ITEXP	1157.565	1298055	0.931889	29622.63	43.71802	1914.489	2.93E+08*	1921
ITRCPT	950.1868	310652.3	0.211532	7193.892	41.58684	1789.989	2.56E+08*	1921
GDPPCGR	0.026852	0.322496	-0.192922	0.039761	-0.063636	8.598306	2362.244*	1808
ITARRGR	-0.027283	1.285837	-3.187505	0.228891	-3.931493	50.49608	174600.3*	1808
ITEXPGR	-0.01051	2.391994	-4.056758	0.275857	-1.848721	40.66897	107924.2*	1808
ITRCPTGR	-0.00541	3.486144	-3.693053	0.287256	-0.927068	39.35676	99835.66*	1808
Developed (24) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	35964.04	87716.7	12029.1	14044.33	1.028633	4.481268	104.6983*	408
ITARR	1.195314	4.334277	0.022792	0.920678	1.253406	4.116075	122.6719*	408
ITEXP	1272.754	8199.729	205.2224	1288.248	3.100961	14.37908	2736.141*	408
ITRCPT	1481.641	10408.07	33.34613	1533.914	3.27536	15.74375	3344.923*	408
GDPPCGR	0.014595	0.067603	-0.094036	0.024298	-1.288398	5.699853	213.5793*	384
ITARRGR	-0.000377	0.699153	-0.304769	0.083889	2.311326	20.40968	4975.143*	384
ITEXPGR	0.020899	0.78697	-0.809338	0.125713	-0.631055	12.32034	1356.412*	384
ITRCPTGR	0.019862	0.65214	-0.556933	0.112288	0.208364	7.373704	295.9785*	384
Developing (89) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	5240.64	36654.2	125.267	6494.402	2.232226	8.227017	3012.382*	1513
ITARR	0.823691	103.5508	0.001305	3.050059	25.63831	844.7791	45340364*	1513
ITEXP	1128.128	1298055	0.931889	33188.39	39.04131	1526.137	1.48E+08*	1513
ITRCPT	814.3708	310652.3	0.211532	8018.444	37.75685	1459.006	1.36E+08*	1513
GDPPCGR	0.029985	0.322496	-0.192922	0.042266	-0.147388	8.192796	1623.121*	1424
ITARRGR	-0.034159	1.285837	-3.187505	0.252512	-3.626462	42.34212	96024.43*	1424
ITEXPGR	-0.018536	2.391994	-4.056758	0.302011	-1.691939	35.27606	63191.7*	1424
ITRCPTGR	-0.011869	3.486144	-3.693053	0.316539	-0.819036	33.42185	55690.35*	1424

JB denote Jarque-Bera. * indicates 1 percent levels of significance. GR at the end of the acronym indicates growth rates.

Table 4: Descriptive Statistics - By clusters

TTCI1 (27) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	1228.767	6509.56	125.267	1299.705	1.84651	6.153373	451.0087*	459
ITARR	0.241687	5.721794	0.001814	0.639674	5.636841	38.33109	26304.17*	459
ITEXP	100.6293	4556.744	1.216888	312.7924	9.087286	107.7736	216262*	459
ITRCPT	144.6121	3553.786	0.213871	420.8278	5.209136	31.61664	17737.53*	459
GDPPCGR	0.022206	0.188315	-0.134202	0.035701	-0.425523	6.942423	292.8056*	432
ITARRGR	-0.047835	1.109634	-1.190441	0.241415	0.11032	7.317098	336.3483*	432
ITEXPGR	-0.039608	2.391994	-1.406037	0.315911	0.96197	14.23096	2337.046*	432
ITRCPTGR	-0.031945	1.981734	-1.172014	0.315255	0.598826	8.233209	518.7753*	432
TTCI2 (43) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	5530.38	22273.2	469.47	4883.41	1.608759	5.090203	448.3885*	731
ITARR	0.791162	21.86591	0.001305	1.801211	5.491805	42.0602	50144.74*	731
ITEXP	220.081	1968.311	0.931889	279.4399	2.606553	10.98921	2771.828*	731
ITRCPT	542.6808	8978.95	1.351238	1111.748	4.713855	28.03761	21800.96*	731
GDPPCGR	0.035472	0.322496	-0.192922	0.045255	-0.057747	9.348653	1155.804*	688
ITARRGR	-0.018933	0.970898	-2.289284	0.207042	-2.605282	27.62892	18167.04*	688
ITEXPGR	0.002603	2.078599	-2.23065	0.243616	0.125204	24.89705	13746.92*	688
ITRCPTGR	0.010353	1.704141	-2.398752	0.254747	-1.105612	20.63435	9054.643*	688
TTCI3 (30) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	31788.7	87716.7	4347.82	15210.49	0.752803	4.125135	75.0715*	510
ITARR	1.143672	4.334277	0.022792	0.879543	1.24174	4.284655	166.1327*	510
ITEXP	1188.96	8199.729	112.3175	1216.442	3.041678	14.86178	3776.316*	510
ITRCPT	1380.55	10408.07	33.34613	1408.012	3.455973	18.06086	5835.348*	510
GDPPCGR	0.018428	0.12238	-0.151659	0.03025	-0.898466	6.685249	336.2005*	480
ITARRGR	0.006704	0.699153	-0.304769	0.091459	1.580741	12.8178	2127.684*	480
ITEXPGR	0.026301	0.78697	-0.809338	0.139024	-0.792003	9.912194	1005.75*	480
ITRCPTGR	0.022627	0.65214	-0.556933	0.122962	-0.039085	6.009634	181.2802*	480
TOURSPEC1 (52) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	8488.233	87716.7	143.784	13338.2	3.135171	14.77775	6557.534*	884
ITARR	1.278075	103.5508	0.001305	3.850765	21.46493	564.6259	11685986*	884
ITEXP	2032.746	1298055	0.931889	43660.43	29.63875	880.2962	28478153*	884
ITRCPT	1501.56	310652.3	0.211532	10562.5	28.42043	832.0467	25435231*	884
GDPPCGR	0.02865	0.322496	-0.192922	0.04567	0.287318	8.186297	943.8999*	832
ITARRGR	-0.027901	1.285837	-3.187505	0.256222	-3.121406	38.64856	45406.15*	832
ITEXPGR	-0.014528	2.391994	-4.056758	0.337054	-1.654793	36.07628	38306.45*	832
ITRCPTGR	-0.013003	3.486144	-3.693053	0.351575	-0.543128	34.16656	33714.53*	832
TOURSPEC2 (37) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	9031.524	67804.5	125.267	14583.85	2.233142	7.143084	972.6657*	629
ITARR	0.555036	21.86591	0.004565	1.295358	9.674043	134.6462	464020.3*	629
ITEXP	321.4999	4843.984	1.433224	592.208	3.278599	16.7047	6049.295*	629
ITRCPT	380.7326	4176.351	2.431151	536.1074	2.551354	11.35548	2512.113*	629
GDPPCGR	0.026382	0.13957	-0.155726	0.035138	-1.206907	8.091404	783.1394*	592
ITARRGR	-0.034094	0.996855	-2.978667	0.243614	-4.656795	52.84726	63430.14*	592
ITEXPGR	-0.021291	0.892941	-2.23065	0.23028	-2.017069	20.84152	8253.324*	592
ITRCPTGR	-0.005593	1.165318	-2.398752	0.251228	-1.674922	20.05372	7450.586*	592
TOURSPEC3 (24) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	21803.16	55377.8	469.47	14832.75	0.109136	1.777188	26.22952*	408
ITARR	0.609507	9.611262	0.003583	0.726473	6.008995	66.78515	71620.62*	408
ITEXP	550.2744	2156.211	1.996698	518.4523	1.063817	3.148408	77.33047*	408
ITRCPT	633.4524	6726.391	4.959693	620.4063	3.246668	27.52915	10945.32*	408
GDPPCGR	0.023683	0.127561	-0.081155	0.031794	-0.298181	4.226978	29.77793*	384
ITARRGR	-0.015445	0.46841	-0.891224	0.113798	-2.068053	17.06767	3440.106*	384
ITEXPGR	0.014818	0.78697	-0.860433	0.172778	-0.8421	8.555931	539.2784*	384
ITRCPTGR	0.011324	0.65214	-1.099978	0.152725	-1.836155	14.79871	2443.128*	384
STANLIV1 (47) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	3022.652	23431.5	125.267	3224.797	3.360412	18.10887	9103.524*	799
ITARR	0.451402	21.86591	0.001814	1.183919	10.46478	156.5551	799573.2*	799
ITEXP	145.8588	4843.984	1.433224	345.49	9.470696	113.5095	418513.4*	799
ITRCPT	246.3848	4176.351	0.483882	407.155	4.191859	28.03692	23208.76*	799
GDPPCGR	0.03401	0.322496	-0.192922	0.044592	-0.022687	9.393733	1280.966*	752
ITARRGR	-0.037247	0.970898	-2.978667	0.240267	-4.124599	44.42038	55889.18*	752
ITEXPGR	-0.012083	2.078599	-2.23065	0.265033	-0.107304	18.53683	7565.095*	752
ITRCPTGR	0.000381	1.981734	-2.398752	0.284368	-0.333141	16.37262	5617.151*	752
STANLIV2 (21) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	15973.54	58009.8	469.47	10974.5	1.395372	5.460861	205.9309*	357
ITARR	1.541968	11.19878	0.003583	2.014605	2.934195	12.16095	1760.621*	357
ITEXP	696.2206	5433.309	1.996698	844.9525	2.45542	10.06312	1100.811*	357
ITRCPT	1171.396	6726.391	4.959693	1021.027	1.221917	4.902895	142.7008*	357
GDPPCGR	0.025146	0.12238	-0.151659	0.035741	-0.891848	5.269179	116.6304*	336
ITARRGR	-0.010759	0.675201	-0.891224	0.146277	-1.372665	12.42054	1347.966*	336
ITEXPGR	0.010065	0.553917	-0.860433	0.171198	-0.830307	6.627499	222.8295*	336
ITRCPTGR	0.002499	0.459883	-0.857649	0.160462	-1.011656	7.193418	303.4997*	336
STANLIV3 (20) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	36529.86	87716.7	4560.64	14602.89	0.713278	4.800473	74.75419*	340
ITARR	1.124493	9.869915	0.022792	1.319372	3.283036	17.22509	3477.443*	340
ITEXP	1284.297	8199.729	84.53983	1278.926	3.346491	16.1225	3074.109*	340
ITRCPT	1531.502	10408.07	33.34613	1945.29	2.647843	9.335231	965.8755*	340
GDPPCGR	0.014416	0.067603	-0.094036	0.02274	-1.288843	6.204541	225.514*	320
ITARRGR	-0.006151	0.699153	-0.399984	0.09066	1.851706	19.28896	3720.605*	320
ITEXPGR	0.015845	0.415732	-0.340079	0.106129	-0.212945	3.797999	10.90913*	320
ITRCPTGR	0.018931	0.65214	-0.296196	0.110067	0.789287	7.188552	267.1448*	320

JB denote Jarque-Bera. * indicates 1 percent levels of significance. GR at the end of the acronym indicates growth rates.

Table 4: Descriptive Statistics - By clusters ...continued

	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
POLREG1 (32) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	2914.466	34378.9	125.267	5270.849	3.547442	16.6335	5354.087*	544
ITARR	0.874653	103.5508	0.001814	4.748821	18.82236	403.5606	3668960*	544
ITEXP	2662.718	1298055	1.216888	55655.98	23.24171	541.4484	6620648*	544
ITRCPT	910.451	310652.3	0.211532	13324.07	23.15748	538.8291	6556512*	544
GDPPCGR	0.03672	0.322496	-0.155308	0.044906	0.688853	10.09238	1113.6*	512
ITARRGR	-0.040458	1.285837	-3.187505	0.334261	-3.505746	32.99917	20247.7*	512
ITEXPGR	-0.042826	1.597482	-4.056758	0.380428	-2.677258	29.33492	15406.91*	512
ITRCPTGR	-0.025152	3.486144	-3.693053	0.420858	-0.606085	26.3205	11633.39*	512
POLREG2 (39) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	5627.282	37582.7	203.053	7428.607	2.834821	10.96911	2642.375*	663
ITARR	0.446066	21.86591	0.001305	1.203505	11.69013	177.1885	853288.5*	663
ITEXP	195.5019	4556.744	0.931889	356.0236	5.448195	47.07758	56950.71*	663
ITRCPT	266.3676	6726.391	1.351238	462.8785	6.816638	76.60701	154806.6*	663
GDPPCGR	0.027245	0.150109	-0.192922	0.040107	-0.97212	6.514741	419.4704*	624
ITARRGR	-0.034254	0.768641	-2.289284	0.206598	-3.025277	29.18194	18774.69*	624
ITEXPGR	-0.000734	2.391994	-2.23065	0.266079	1.106608	29.7708	18760.93*	624
ITRCPTGR	-0.00225	1.704141	-2.398752	0.257225	-1.232902	20.37821	8010.138*	624
POLREG3 (27) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	26753.95	67804.5	700.928	15362.89	0.150702	2.523081	6.087403*	459
ITARR	0.874607	3.798314	0.022792	0.692816	1.784237	6.479978	475.1464*	459
ITEXP	772.6651	3261.766	36.34653	580.4	1.308623	5.102749	215.568*	459
ITRCPT	959.8384	3606.833	33.34613	627.9668	1.436449	5.780789	305.7385*	459
GDPPCGR	0.019711	0.146214	-0.153913	0.029905	-0.706479	7.859152	460.9406*	432
ITARRGR	-0.003179	1.109634	-0.742807	0.128016	1.125903	22.01634	6600.456*	432
ITEXPGR	0.013523	0.978605	-0.870858	0.154796	0.413124	12.1086	1505.687*	432
ITRCPTGR	0.015421	1.052049	-0.656403	0.14989	1.119122	14.53012	2483.162*	432
GOVEFF1 (35) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	1492.196	6649.4	125.267	1476.148	1.522123	4.630699	295.6807*	595
ITARR	0.508723	103.5508	0.001814	4.3452	22.54068	533.4308	7025689*	595
ITEXP	2367.745	1298055	1.216888	53219.96	24.31399	592.4431	8672321*	595
ITRCPT	680.9575	310652.3	0.211532	12738.98	24.27412	591.1413	8634122*	595
GDPPCGR	0.02998	0.285407	-0.155726	0.043554	0.236792	7.682221	516.7744*	560
ITARRGR	-0.069282	1.285837	-3.187505	0.330672	-3.162811	30.70035	18837.53*	560
ITEXPGR	-0.062835	2.391994	-4.056758	0.387747	-1.788357	27.52489	14332.81*	560
ITRCPTGR	-0.049642	3.486144	-3.693053	0.410897	-0.681543	25.56082	11919.8*	560
GOVEFF2 (40) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	5837.82	31263.5	405.35	6068.463	2.182968	7.86449	1210.532*	680
ITARR	0.969212	21.86591	0.001305	1.850291	4.849667	36.44023	34349.23*	680
ITEXP	222.4035	2125.871	0.931889	296.682	2.851759	12.77811	3630.679*	680
ITRCPT	753.8852	8978.95	1.351238	1318.54	3.356598	15.3984	5632.309*	680
GDPPCGR	0.028622	0.322496	-0.155308	0.040264	0.014515	9.15975	1011.823*	640
ITARRGR	-0.018181	0.970898	-2.289284	0.1974	-3.02321	34.7349	27831.01*	640
ITEXPGR	-0.000282	2.078599	-2.23065	0.236504	-0.667165	26.67999	15000.6*	640
ITRCPTGR	0.005256	1.981734	-2.398752	0.246701	-0.889482	25.90244	14071.64*	640
GOVEFF3 (38) countries								
	Mean	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	JB	Obs.
GDPPC	26660.28	87716.7	3280.84	16668.3	0.762945	3.579963	71.72474*	646
ITARR	1.185543	9.869915	0.022792	1.188352	2.688564	14.29606	4212.849*	646
ITEXP	1027.307	8199.729	55.00152	1140.751	3.23502	16.96327	6374.794*	646
ITRCPT	1404.794	10408.07	33.34613	1567.781	2.898439	12.67068	3421.804*	646
GDPPCGR	0.022109	0.13957	-0.192922	0.034898	-0.917262	8.071646	736.8724*	608
ITARRGR	0.001819	0.699153	-0.742807	0.108092	-0.031385	11.68228	1909.775*	608
ITEXPGR	0.026918	1.75432	-0.809338	0.158608	1.728903	28.08495	16244.01*	608
ITRCPTGR	0.024102	1.704141	-0.556933	0.152618	2.456712	30.5076	19780.51*	608

JB denote Jarque-Bera. * indicates 1 percent levels of significance. GR at the end of the acronym indicates growth rates.

Table 5: Panel unit root test results

	Variables	H_0: Unit root LLC	IPS
All countries	GDPPC	14.3898 [1.0000]	13.9554 [1.0000]
	ITARR	6.32751 [1.0000]	12.3689 [1.0000]
	ITEXP	9.91348 [1.0000]	13.8862 [1.0000]
	ITRCPT	9.37332 [1.0000]	15.7990 [1.0000]
	GDPPCGR	-24.3474*** [0.0000]	-16.8728*** [0.0000]
	ITARRGR	-28.1292*** [0.0000]	-23.0880*** [0.0000]
	ITEXPGR	-28.7641*** [0.0000]	-23.3049*** [0.0000]
	ITRCPTGR	-26.6004*** [0.0000]	-21.6964*** [0.0000]
Developed countries	GDPPC	-7.87582*** [0.0000]	-2.50518*** [0.0061]
	ITARR	-0.57004 [0.2843]	2.31223 [0.9896]
	ITEXP	2.93563 [0.9983]	4.84224 [1.0000]
	ITRCPT	2.84730 [0.9978]	6.43783 [1.0000]
	GDPPCGR	-7.16558*** [0.0000]	-4.76549*** [0.0000]
	ITARRGR	-9.42173*** [0.0000]	-9.42644*** [0.0000]
	ITEXPGR	-13.6626*** [0.0000]	-9.48820*** [0.0000]
	ITRCPTGR	-13.6174*** [0.0000]	-10.1013*** [0.0000]
Developing countries	GDPPC	17.2937 [1.0000]	16.8680 [1.0000]
	ITARR	7.11755 [1.0000]	12.7408 [1.0000]
	ITEXP	9.66687 [1.0000]	13.1233 [1.0000]
	ITRCPT	8.94538 [1.0000]	14.4477 [1.0000]
	GDPPCGR	-23.5334*** [0.0000]	-16.4886*** [0.0000]
	ITARRGR	-26.6278*** [0.0000]	-21.1095*** [0.0000]
	ITEXPGR	-25.3588*** [0.0000]	-21.3227*** [0.0000]
	ITRCPTGR	-22.9974*** [0.0000]	-19.2041*** [0.0000]
TTCI1	GDPPC	12.9575 [1.0000]	10.8270 [1.0000]
	ITARR	4.39580 [1.0000]	7.49839 [1.0000]
	ITEXP	2.78273 [0.9973]	4.85496 [1.0000]
	ITRCPT	3.71093 [0.9999]	5.94884 [1.0000]
	GDPPCGR	-9.87923*** [0.0000]	-8.96307*** [0.0000]
	ITARRGR	-17.5590*** [0.0000]	-14.1157*** [0.0000]
	ITEXPGR	-13.8137*** [0.0000]	-12.2627*** [0.0000]
	ITRCPTGR	-14.0937*** [0.0000]	-11.4513*** [0.0000]
TTCI2	GDPPC	8.08290 [1.0000]	11.6414 [1.0000]
	ITARR	6.47539 [1.0000]	9.78823 [1.0000]
	ITEXP	8.92717 [1.0000]	11.1220 [1.0000]
	ITRCPT	6.66658 [1.0000]	11.0677 [1.0000]
	GDPPCGR	-19.8620*** [0.0000]	-12.2324*** [0.0000]
	ITARRGR	-18.6781*** [0.0000]	-14.2515*** [0.0000]
	ITEXPGR	-18.0525*** [0.0000]	-14.2542*** [0.0000]
	ITRCPTGR	-15.6079*** [0.0000]	-12.9300*** [0.0000]
TTCI3	GDPPC	-6.90756 [0.0000]	-0.79006 [0.2147]
	ITARR	-0.84876 [0.1980]	3.60183 [0.9998]
	ITEXP	5.03220 [1.0000]	7.36382 [1.0000]
	ITRCPT	4.78715 [1.0000]	8.94042 [1.0000]
	GDPPCGR	-9.05792*** [0.0000]	-6.71182*** [0.0000]
	ITARRGR	-11.5706*** [0.0000]	-11.1243*** [0.0000]
	ITEXPGR	-15.1033*** [0.0000]	-11.3332*** [0.0000]
	ITRCPTGR	-14.7495*** [0.0000]	-11.0379*** [0.0000]
TOURSPEC1	GDPPC	14.6899 [1.0000]	9.72614 [1.0000]
	ITARR	4.55456 [1.0000]	9.39832 [1.0000]
	ITEXP	4.69081 [1.0000]	8.21386 [1.0000]
	ITRCPT	5.36926 [1.0000]	9.82557 [1.0000]
	GDPPCGR	-14.3477*** [0.0000]	-10.8202*** [0.0000]
	ITARRGR	-20.4709*** [0.0000]	-16.2174*** [0.0000]
	ITEXPGR	-20.8020*** [0.0000]	-17.3855*** [0.0000]
	ITRCPTGR	-18.0288*** [0.0000]	-15.0796*** [0.0000]
TOURSPEC2	GDPPC	6.08661 [1.0000]	10.1445 [1.0000]
	ITARR	5.88017 [1.0000]	8.52230 [1.0000]
	ITEXP	5.73984 [1.0000]	8.38120 [1.0000]
	ITRCPT	6.95799 [1.0000]	9.85084 [1.0000]
	GDPPCGR	-17.7256*** [0.0000]	-11.6639*** [0.0000]
	ITARRGR	-16.5620*** [0.0000]	-13.5167*** [0.0000]
	ITEXPGR	-14.8273*** [0.0000]	-12.3506*** [0.0000]
	ITRCPTGR	-14.5946*** [0.0000]	-11.5227*** [0.0000]
TOURSPEC3	GDPPC	-0.18335 [0.4273]	3.29062 [0.9995]
	ITARR	0.15330 [0.5609]	2.52670 [0.9942]
	ITEXP	6.79614 [1.0000]	7.62149 [1.0000]
	ITRCPT	4.02817 [1.0000]	7.62015 [1.0000]
	GDPPCGR	-8.57898*** [0.0000]	-6.21112*** [0.0000]
	ITARRGR	-10.3643*** [0.0000]	-9.44451*** [0.0000]
	ITEXPGR	-13.3387*** [0.0000]	-9.64366*** [0.0000]
	ITRCPTGR	-13.0332*** [0.0000]	-10.5636*** [0.0000]

The numbers in brackets denote p-values. The LLC and IPS tests are performed using the Newey–West bandwidth selection with Barlett Kernel, and the Schwartz Bayesian Criterion is used to determine to optimal lag length. GR at the end of the acronym indicates growth rates. *, ** and *** indicate rejection of the null hypothesis at the 10, 5 and 1 percent levels of significance, respectively.

Table 5: Panel unit root test results ...continued

	Variables	LLC (H_0: Unit root)	IPS (H_0: Unit root)
STANLIV1	GDPPC	14.7774 [1.0000]	14.6962 [1.0000]
	ITARR	6.93101 [1.0000]	10.2242 [1.0000]
	ITEXP	9.90525 [1.0000]	11.3838 [1.0000]
	ITRCPT	7.22396 [1.0000]	11.8055 [1.0000]
	GDPPCGR	-17.5428*** [0.0000]	-10.5848*** [0.0000]
	ITARRGR	-19.5179*** [0.0000]	-15.4341*** [0.0000]
	ITEXPGR	-18.7347*** [0.0000]	-15.0979*** [0.0000]
	ITRCPTGR	-16.9381*** [0.0000]	-14.7236*** [0.0000]
STANLIV2	GDPPC	0.80425 [0.7894]	3.28722 [0.9995]
	ITARR	0.05242 [0.5209]	4.11229 [1.0000]
	ITEXP	2.51660 [0.9941]	5.17249 [1.0000]
	ITRCPT	2.99717 [0.9986]	6.29448 [1.0000]
	GDPPCGR	-9.82673*** [0.0000]	-6.93240*** [0.0000]
	ITARRGR	-9.99918*** [0.0000]	-8.91552*** [0.0000]
	ITEXPGR	-10.1761*** [0.0000]	-8.64017*** [0.0000]
	ITRCPTGR	-10.2984*** [0.0000]	-7.43545*** [0.0000]
STANLIV3	GDPPC	-6.11071*** [0.0000]	-1.31428* [0.0944]
	ITARR	-0.47560 [0.3172]	2.58328 [0.9951]
	ITEXP	4.18508 [1.0000]	6.55167 [1.0000]
	ITRCPT	3.15256 [0.9992]	6.78041 [1.0000]
	GDPPCGR	-7.79155*** [0.0000]	-4.96486*** [0.0000]
	ITARRGR	-10.6082*** [0.0000]	-9.46985*** [0.0000]
	ITEXPGR	-13.0708*** [0.0000]	-9.10752*** [0.0000]
	ITRCPTGR	-13.6336*** [0.0000]	-9.86753*** [0.0000]
POLREG1	GDPPC	16.7352 [1.0000]	13.0879 [1.0000]
	ITARR	6.45275 [1.0000]	10.0132 [1.0000]
	ITEXP	10.0450 [1.0000]	9.70755 [1.0000]
	ITRCPT	7.74476 [1.0000]	10.8190 [1.0000]
	GDPPCGR	-15.4104*** [0.0000]	-10.9596*** [0.0000]
	ITARRGR	-13.0589*** [0.0000]	-11.6446*** [0.0000]
	ITEXPGR	-13.7357*** [0.0000]	-12.7005*** [0.0000]
	ITRCPTGR	-14.5360*** [0.0000]	-12.0579*** [0.0000]
POLREG2	GDPPC	6.27527 [1.0000]	10.9565 [1.0000]
	ITARR	4.30978 [1.0000]	7.73564 [1.0000]
	ITEXP	5.03177 [1.0000]	8.60994 [1.0000]
	ITRCPT	4.80054 [1.0000]	8.51076 [1.0000]
	GDPPCGR	-15.4186*** [0.0000]	-10.8160*** [0.0000]
	ITARRGR	-19.8876*** [0.0000]	-14.6368*** [0.0000]
	ITEXPGR	-17.8061*** [0.0000]	-13.6684*** [0.0000]
	ITRCPTGR	-14.8223*** [0.0000]	-12.7198*** [0.0000]
POLREG3	GDPPC	-4.97853*** [0.0000]	0.26557 [0.6047]
	ITARR	-0.58580 [0.2790]	3.25526 [0.9994]
	ITEXP	3.33703 [0.9996]	5.57201 [1.0000]
	ITRCPT	3.61969 [0.9999]	7.17670 [1.0000]
	GDPPCGR	-7.80747*** [0.0000]	-5.59581*** [0.0000]
	ITARRGR	-11.8088*** [0.0000]	-11.0657*** [0.0000]
	ITEXPGR	-13.8568*** [0.0000]	-10.4029*** [0.0000]
	ITRCPTGR	-12.5308*** [0.0000]	-9.41507*** [0.0000]
GOVEFF1	GDPPC	16.4313 [1.0000]	12.9248 [1.0000]
	ITARR	4.72238 [1.0000]	8.15357 [1.0000]
	ITEXP	3.98317 [1.0000]	5.94292 [1.0000]
	ITRCPT	6.53333 [1.0000]	9.99262 [1.0000]
	GDPPCGR	-11.0004*** [0.0000]	-9.81552*** [0.0000]
	ITARRGR	-15.4156*** [0.0000]	-13.1614*** [0.0000]
	ITEXPGR	-13.6546*** [0.0000]	-12.4238*** [0.0000]
	ITRCPTGR	-14.1224*** [0.0000]	-11.7952*** [0.0000]
GOVEFF2	GDPPC	7.66411 [1.0000]	10.6261 [1.0000]
	ITARR	6.40165 [1.0000]	9.20338 [1.0000]
	ITEXP	8.17786 [1.0000]	10.2757 [1.0000]
	ITRCPT	4.80897 [1.0000]	8.24106 [1.0000]
	GDPPCGR	-17.7393*** [0.0000]	-10.4542*** [0.0000]
	ITARRGR	-19.0352*** [0.0000]	-13.9741*** [0.0000]
	ITEXPGR	-16.7707*** [0.0000]	-13.3398*** [0.0000]
	ITRCPTGR	-16.7773*** [0.0000]	-13.3528*** [0.0000]
GOVEFF3	GDPPC	-5.65948*** [0.0000]	0.61702 [0.7314]
	ITARR	-0.70462 [0.2405]	4.07887 [1.0000]
	ITEXP	4.61979 [1.0000]	7.72947 [1.0000]
	ITRCPT	4.87114 [1.0000]	9.18860 [1.0000]
	GDPPCGR	-12.6359*** [0.0000]	-8.95215*** [0.0000]
	ITARRGR	-14.0090*** [0.0000]	-12.8417*** [0.0000]
	ITEXPGR	-19.4033*** [0.0000]	-14.5802*** [0.0000]
	ITRCPTGR	-15.1140*** [0.0000]	-12.3968*** [0.0000]

The numbers in brackets denote p-values. The LLC and IPS tests are performed using the Newey–West bandwidth selection with Barlett Kernel, and the Schwartz Bayesian Criterion is used to determine to optimal lag length. GR at the end of the acronym indicates growth rates. *, ** and *** indicate rejection of the null hypothesis at the 10, 5 and 1 percent levels of significance, respectively.

Table 6: Panel causality tests between tourism growth and economic growth

	Null hypothesis					
	ITARRGR $\nRightarrow$ GDPPCGR	ITEXPGR $\nRightarrow$ GDPPCGR	ITRCPTGR $\nRightarrow$ GDPPCGR	GDPPCGR $\nRightarrow$ ITARRGR	GDPPCGR $\nRightarrow$ ITEXPGR	GDPPCGR $\nRightarrow$ ITRCPTGR
All countries	0.32721	1.07708	0.75313	4.05908**	5.47338***	7.19093***
Developed countries	1.48161	0.69124	1.27227	1.35578	3.54142**	3.37377**
Developing countries	0.43135	0.56995	0.15380	2.79411*	3.91890**	6.57213***
TTCI1	0.66899	0.73215	0.93998	3.40289**	1.00741	1.32244
TTCI2	0.55842	0.73854	0.50333	0.36396	9.51118***	7.74936***
TTCI3	4.42487**	0.90948	0.38970	2.75640*	1.13295	1.55183
TOURSPEC1	0.97185	1.96822	0.46646	0.98651	0.93791	4.82109***
TOURSPEC2	0.24020	2.19776	0.84003	6.05184***	4.88761***	1.47105
TOURSPEC3	0.16110	3.51126**	3.91037**	3.28244**	1.69562	3.44891**
STANLIV1	0.19767	1.04866	1.09259	3.50057**	5.87319***	7.02521***
STANLIV2	1.51932	0.27150	0.16527	4.65649**	3.26743**	3.13624**
STANLIV3	0.16152	3.19439**	3.61156**	0.41093	1.10946	1.77584
GOVEFF1	0.19560	0.41473	0.31257	1.32894	0.89888	2.85862*
GOVEFF2	0.71690	1.07916	0.85462	0.73250	5.29318***	3.34018**
GOVEFF3	6.06772***	3.20978**	0.50586	3.74617**	7.80321***	2.96029*
POLREG1	0.06654	0.82686	0.26950	0.68072	0.23918	0.78880
POLREG2	1.36109	0.01142	0.45564	2.90924*	6.24510***	11.7841***
POLREG3	0.80966	4.66783***	0.81411	2.48595*	9.04444***	4.47065**

*, ** and *** indicate rejection of the null hypothesis at the 10, 5 and 1 percent levels of significance, respectively.

Table 7: Clusters statistics

Cluster name	Cluster Group	Cluster Centers	Maximum	Minimum
STANLIV	STANLIV1	8700.55	18551.31	749.72
	STANLIV2	31046.20	43818.30	20058.82
	STANLIV3	64080.95	89510.34	51170.00
GOVEFF	GOVEFF1	-0.76	-0.31	-1.45
	GOVEFF2	0.16	0.69	-0.29
	GOVEFF3	1.39	2.21	0.82
POLREG	POLREG1	-1	5	-8
	POLREG2	8	9	6
	POLREG3	10	10	10
TOURSPEC	TOURSPEC1	1.59	3	0
	TOURSPEC2	6.38	9	4
	TOURSPEC3	22.83	49	10
TTCI	TTCI1	3.37	3.77	2.82
	TTCI2	4.20	4.59	3.82
	TTCI3	5.10	5.66	4.70

The figures related to the $STANLIV$ denote real GDP per capita, while the figures for the remaining clusters denote index scores.