ASSESSING THE DYNAMIC ECONOMIC IMPACT OF TOURISM FOR ISLAND ECONOMIES

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Abstract: Using a panel data of 19 island economies for the years that span from 1990 to 2007, this study explores the potential contribution of tourism to economic growth and development within the conventional augmented Solow growth model. Since economic growth is argued to be essentially a dynamic phenomenon we employ GMM method to account for these issues. The results show that tourism significantly contributes to the economic growth of island economies. Moreover, the tourist-growth nexus is observed to be a dynamic phenomenon and Granger causality analysis reveals a bi-causal relationship between tourist and growth. Comparative analysis with samples of developing and developed countries shows that tourism development on island economies may have comparatively higher growth effects.

Keywords: economic growth, island economies, dynamic panel data.

INTRODUCTION

Tourism remains the world’s largest industry and one of the fastest growing sectors, accounting for over one-third of the value of total worldwide services trade (WTO, 2006). Worldwide tourism grew phenomenally from 25 million arrivals in 1950 to more that 825 million in 2007, with an average annual growth rate of 6.5 percent (UNWTO, 2008). World international tourist receipts amounted to more than 800 billion dollars in 2007, as compared to 106.5 billion dollars in 1980 and 273.2 in 1990, with an average 7 yearly rate of growth in current terms between 1980 and 2007. These figures represented more than 6% of overall international exports in 200 (WTO, 2007).

Pioneering studies from Lea (1988) and Sinclair (1998) have highlighted the potential of the tourism sector in promoting growth, creating jobs and generating revenue for the government. In fact the tourism-led growth hypothesis (TLGH) postulates that international tourism is considered as a potential strategic factor for economic growth.\(^1\) Tourist spending, as an alternative form of exports (as it represents essentially

\(^{1}\) Refer to Sinclair and Stabler (2002) for a good theoretical treatment.
an export in service in addition of goods), is believed to contribute to the balance of payments through foreign exchange earnings and proceeds generated from tourism expansion and can represent a significant income source for a national economy (Balaguer & Cantavella-Jordà, 2002). Foreign exchange earnings from tourism can subsequently also be used to import capital goods to produce goods and services, which in turn leads to economic growth (McKinnon, 1964). Other economic benefits derived from tourism activity include tax revenues, employment (it tends to be labour intensive) and additional sources of income (Archer, 1995; Durburry, 2002; Khan, Seng, & Cheong, 1990; Uysal & Gitelson, 1994). Theoretical analysis tends to posit that tourism expansion should have a positive contribution to economic growth (Balaguer & Cantavella-Jordà, 2002; Dritsakis, 2004). However, some authors for instance Brau, Lanza, and Pigliaru (2004, 2007), Figini and Vici (2009) recently also claimed that the opposite is true.

This issue has attracted great interest only recently (Read, 2004 provides a comprehensive survey of the literature) and there are a number of empirical papers confirming the tourism industry’s contribution to a country’s economic growth (see Balaguer & Cantavella-Jordà, 2002; Dritsakis, 2004; Gunduz & Hatemi, 2005; Kim, Chen, & Jan, 2006; Noriko & Mototsugu, 2007). Similarly, Proença and Soukiazis (2005) examined the impact of tourism at the regional level and Shan and Wilson (2001) study the causality between tourism and trade. It should also be added that few authors could not establish any positive link between tourism and economic growth (see Chen & Devereux, 1999; Lee, 2006, Oh, 2005).

Despite the overall belief in tourism-led economic development, relatively speaking not many studies have rigorously investigated a causal relationship between tourism and economic growth for samples of island economies (except Durburry, 2002, 2004; Kim et al., 2006 for the case of Mauritius and Taiwan). Indeed most studies have been dealing with country cases, and to a lower extent within samples, of developed and developing countries. It is a fact that international tourism has become a major industry for many islands around the world during the past decade (representing up to 45% of GDP for some islands (Figini & Vici, 2009). These economies have been growing at around 2.3% in real terms as compared to 1.9% for developed countries and 0.06% for developing countries and 1% for the world over the period 1990–2005. In addition tourism is alleged to have important social impacts as well on island economies and these have been mainly in terms of direct and indirect employment and also via government and private sector investment and expenditures in tourism projects which end up being beneficial to the local population and the general community at large. Appendix 1 gives a concise self explained summary of some social indicators related to tourism development in these economies.

Given that evidences from developed and developing countries are not directly relevant and comparable to island economies given the latter’s special economic and institutional characteristics and particularly their overall vulnerability. This relates to problems arising from the interplay of such factors as their smallness, remoteness, geographical dispersion,
vulnerability to natural disasters, fragility of their ecosystems, constraint on transport and communication, isolation from markets, vulnerability to exogenous economic and financial shocks, small domestic market, lack of natural resources, limited fresh water supply, dependence on imports. Sinclair and Stabler (2002) also argued that developing countries are usually characterized as having low levels of income, an unequal distribution of income and wealth, high levels of unemployment and underemployment, low levels of industrial development which is hampered by a small domestic market and a heavy dependence on agriculture for export earnings. Thus the rapid injection of tourist expenditures into developing countries maybe different and have more significant impacts than if equivalent sums are expended in developed economies.

The aim of the paper is thus to fill the above gap in the literature and to establish the empirical link of the extent to which the tourism industry can spur economic growth while accounting for the conventional sources of economic growth using standard theory for a sample of island economies. In an attempt to attain this objective, this study makes use of data from 19 island economies over a period of 13 years (1990–2007). The basis for the selection of Island economies that are included in the set is purely based on existence and availability of comparable data. The study is also extended to two other samples of countries namely developing and developed for useful comparative purposes on the relative potential of tourism. Another research contribution of this study lies in the fact that researchers have inadequately dealt so far with the issue of dynamics in the tourism development and economic growth link. The study thus additionally uses dynamic panel data estimates, namely the Generalised Methods of Moments (GMM) method to account for important dynamics issues. Empirical studies of this nature certainly add to the growing body of literature in the debate of tourism development and growth and as such also bring new evidence from the sample of island economies.

The rest of the paper is organized as follows. Related literature provides a review of selected literature. In Methodology and analysis, we specify an augmented Solow-growth model which incorporates tourism as one of the sources of growth. It also presents both the cross section and fixed effects regression results accounting for both the country and time effects and the Arellano and Bond (2002) dynamic panel data estimates for reflecting both the dynamic nature of the data and endogeneity of some of the conventional growth sources. The last section summarizes the results and draws the conclusions.

RELATED LITERATURE

Theoretical Background

As previously discussed, it is well documented that tourist spending, essentially an export in service, contribute to the balance of payments

\footnote{The list of the selected Islands and other samples of countries are given in Appendix 2.}
through foreign exchange earnings and proceeds generated, representing a significant income source an economy. Moreover such foreign exchange earnings used in importing capital goods for production will have growth benefits. Other economic benefits derived from tourism encompass tax revenues generation, employments and additional sources of income.

More formally there have been two different strands of the literature dealing with the theoretical relationship between tourism and growth (Figini & Vici, 2009), particularly in the context of small economies, including island countries. The first one has its origin from the Keynesian theory where tourism, through the multiplier, can be seen as an exogenous component of aggregate demand which has a positive effect on income, and subsequently on employment. This approach has been criticized on the ground of being static and failing to shed light on the long run impact of tourism.

The more common theoretical framework in recently has been the trade and endogenous growth theories applied to the tourism sector. Pioneering work from Lanza and Pigliaru (1995) applied the Lucas’ two sector endogenous growth model (1988) to the tourism case. The authors related how tourism is associated with the conditions of growth rate maximisation. Lanza and Pigliaru (1995) suggested that where productivity is a major ingredient of growth, ‘if technological progress is higher in the manufacturing sector than in the tourism sector, tourism specialization is growth enhancing if and only if the change in the terms of trade between tourism and manufacturing goods more than balances the technological gap of the tourism sector’. They further argued that such a condition holds when the two goods are not close substitutes one to each other.

In the context of small economies, including island economies, Candela and Cellini (1997) employed Lanza and Pigliaru (1995) framework and further showed that the easier are the terms of trade offsetting the technology gap when smaller the economy. Indeed the smaller the country, the smaller the opportunity cost of specialisation. Subsequently, Lanza and Pigliaru (2000) interestingly analysed the importance of the natural resource endowment in a specific destination and concluded that the ‘tourist country takes advantage of the presence of natural resources: even when the increase in the terms of trade does not balance the technological gap, the exploitation rate of tourism resources can increase sufficiently to correct the technological gap and to enhance growth’. This theoretical strand has received noteworthy additions from Cerina (2007), Giannoni and Maupertuis (2007) and Lozano, Gomez, and Rey-Maquieira (2008).

Island economies faces enormous difficulties in developing their economies because of geographical and resource limitations. Land remains the most scarce resource and few nations have sufficient natural resources to develop industries such as mining, agriculture and manufacturing, based to a scale that would provide significant economic revenues. In fact islands much dependent on imports for their daily use and increases the degree of leakages and their vulnerability. On the other hand, island economies have important comparative advantages
for the development of the tourism sector and it is thus believed that export of services, especially through tourism exports, may compensate the above and provide important growth potentials. Indeed islands provide exotic tourism natural attractions, sandy beaches and pristine shorelines, can combine beach attractions with hills and mountains (green tourism), have a unique form of flora and fauna, and breathtaking underwater coral reefs and marine life among others.

Empirical Review

Empirical research analyzing the relationship between tourism activity and economic growth has been flourishing recently. For instance, using Spanish data from 1975 to 1997, Balaguer and Cantavella-Jordà (2002) discovered a stable long-run relationship between tourism and economic growth. Dritsakis (2004) examined the impact of tourism on the long-run economic growth of Greece using Granger causality tests based on Error Correction Models and also found a strong causal relationship between tourist earnings and economic growth. Tosun (1999) and Gunduz and Hatemi (2005), for case of Turkey confirmed empirical support for the tourism-led growth hypothesis. Brida, Carrera, and Risso (2008) also confirmed the tourism-led growth hypothesis through cointegration and causality testing for the case of Mexico.

At the regional level for the Portuguese case, employing the convergence approach based on Barro and Sala-i-Martin (1992) type analysis, Proença and Soukiazis (2005) drew the conclusion that tourism can be considered as an alternative solution for enhancing regional growth in Portugal. Cortés-Jiménez (2006) also found that both domestic and international tourism have a significant and positive role in regional economic growth for the Spanish regions and the Italian regions. Other studies using various samples of countries also reported positive contribution of tourism on growth. For instance, Cunado and Pérez de García (2006) found some evidence of conditional convergence toward the African regional average and the U.S average for some countries in their African sample.

Eugenio-Martín, Morales and Scarpa (2004) on the other hand analysed the relationship for the case of Latin America for the period 1985–98. The authors showed that the tourism sector is adequate for the economic growth of medium or low-income countries, though not necessarily for developed countries.

More recently, Fayissa, Nsiah, and Tadasse (2007) studied the hypothesised link in the African context using a panel data of 42 African countries for the years 1995–2004 and showed that receipts from the tourism industry significantly contribute both to the current level of gross domestic product and the economic growth of Sub-Saharan African countries.

It is noteworthy that a few studies could not establish the viable contribution of tourism to economic growth as well. Lee (2008), for instance, using the bounds test developed by Pesaran, Shin, and Smith
(2001) is among those who could not find a cointegrating relationship between tourism and economic growth but rather found support of growth-led tourism hypothesis. Oh (2005) also disagreed with the tourism-led growth theory and using South Korean data in a cointegration analysis, the author rejected any long-run link between tourism receipts and economic growth over the period from 1975 to 2001 (see also Katircioglu, 2009 for Turkey). Chen and Devereux (1999) yet argued that tourism may reduce welfare for trade regimes dominated by export taxes, or import subsidies. Using a theoretical framework, they demonstrated that foreign direct investment in the form of tourism is, for the most part, beneficial while tourist immiserization is still possible in Sub-Saharan Africa. Based on panel data analysis, Sequeira and Campos (2005) also accounted for the endogeneity problem and concluded that tourism, on its own, cannot explain the higher growth rates of the sample of countries. These papers focus on single countries and on the effect of international tourism only.

As far as island economies are concerned, although only couple of country studies can be found from Durbarry (2004) and Kim et al. (2006) who both used cointegration and causality tests framework to support to the contention that tourism has promoted growth for the case of Mauritius and Taiwan respectively, other studies using larger samples only concentrated on tourism economies at large. For instance Lanza and Pigliaru (2000) compared the relative growth performance of 14 “tourism countries” within a sample of 143 countries and interestingly documented that tourism countries grow faster than all the subgroups. Brau, Lanza, and Pigliaru (2007) subsequent study with an extended time period and data set found that tourism countries grow significantly faster than all the other sub-groups and that tourism appears to be an independent determining factor for growth. However, Figini and Vici (2009) used data for more than 150 countries covering different time spans between 1980 and 2005 and found that contrary to previous findings (e.g., Brau, Lanza, & Pigliaru, 2004; Brau et al., 2007), tourism-based countries did not grow at a higher rate than non-tourism based countries. This tally with the results of Sequeira and Macas Nunes (2008) who showed tourism to be a positive determinant of economic growth both in a broad sample and in sample of poor countries. However, they could not find that tourism was more relevant in small countries than in the general sample. It should be emphasized that the above studies used mostly a cross-country regression analysis which are subjected to known critiques.

METHODOLOGY AND ANALYSIS

Economic and Econometric Specification

The growth model that has been adopted in this study is an augmented Solow growth one and is based on the principles of some earlier growth studies (see Durbarry, 2004; Eugenio-Martin et al., 2004; Levine, Loayza, & Beck, 2000; Seetanah, 2008; Temple, 2001 for the
case of island countries). Thus, we include the conventional sources of economic growth namely investment in physical capital (IVTGDP), human capital (SER), and a measure of the openness of the economy (XMGDP). The economic model is augmented to include a proxy for economic freedom (EF) and tourism development (TOUR).

The model takes the following reduced form:

\[ Y = f(IVTGDP, XMGDP, SER, EF, TOUR) \]

\( IVTGDP \) is the gross fixed capital formation as a percent of real GDP used as a proxy for investment in physical capital, \( SER \) is the secondary school enrollment used as measure of investment in human capital and \( XMGDP \) is the ratio of the export plus import to GDP and is a measure of openness. Owen (1987) and Sen (1999) argued that economic freedom is a necessary condition for economic growth. This is measured by the economic freedom index, \( EF \), obtained from the Heritage Foundation (2008).\(^4\) We expect the sign of the economic freedom index to be positive.

The variable of interest to the study is \( TOUR \) which is a measure of tourism development. The total tourist arrivals are utilized as a proxy of tourism expansion (this is consistent with previous works form Wang and Godbey, 1994 and Kim et al., 2006). As a robustness test we also employed another commonly used tourism proxy namely tourism receipt per capita (TRECEIPT).\(^5\) All data were obtained from the World Bank Development Indicators (WDI, 2008) CDROM, except \( EF \) (which is taken from the Heritage Foundation, www.heritage.org/research/feature/index), and the data on tourist (available from the World Bank Development Indicators and World Tourism Organisation, 2004, 2006, 2008 editions). Our focus will be on a sample of 19 island economies for the period 1995–2007, but for better comparative insights and discussions, we also extended the study using the above economic model for both sample of developed and developing economies. The countries in the respective samples are listed in the appendix.

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\(^3\) In a separate specification, not reported here, we also estimate the Arellano-Bond dynamic panel data model by including year dummies to capture the effect of time trend. The results do not differ. Moreover, we also included Foreign Direct Investment in an alternative specification and again the results were more or less the same.

\(^4\) The economic freedom index is calculated as the weighted average of 10 economic freedoms related namely to Business, trade, fiscal, government size, monetary, investment, financial, property rights, corruption and labour freedoms. It is measured on a scale of 0 to 100 with the higher the scale, the higher the level of freedom.

\(^5\) We also run a modified version of the econometric model whereby instead of including tourist or receipts, we segregated the ratio of export to GDP into ratio of export of tourist to GDP (exptour) and ratio of non-tourist export to GDP (expnontour). The results showed that exptour was positive and significant and higher than expnontour for island economies, suggesting that tourist have been a very important element for growth. Such was not the case for the other samples. We did not report the results as one should be caution of the efficiency of the coefficients due to the limited number of observations because of unavailability of data.
The econometric specification can be written as follows:

\[ y_{it} = \beta_0 + \beta_1 \ln(tvdp_{it}) + \beta_2 \ln(mgd_{it}) + \beta_3 \ln(s_{it}) + \beta_4 \ln(ef_{it}) + \beta_5 \ln(tour_{it}) + \epsilon_{it} \]  

where \( i \) denotes the different island countries in the sample (and the different countries in the other samples) and \( t \) denotes the time dimension. The small letters denotes the natural logarithm of the variables implying a double log-linear specification for ease of interpretation (that is in percentage terms).

Often ignored in the literature, we first of all applied the Im, Pesaran, and Shin (1995) panel unit root tests, on the dependent and independent variables. Im et al. (1995) developed a panel unit root test for the joint null hypothesis that every time series in the panel is non-stationary. This approach is based on the average of individual series ADF test and has a standard normal distribution once adjusted in a particular manner. Results of this test applied on our time series in levels reject a unit root in favor of stationarity (the results were also confirmed by the Fisher-ADF and Fisher-PP panel unit root tests) at the 5 percent significance level for each variable. It was judged safe to continue with the panel data estimates of the above econometric specifications (see Table 1).

**Dynamic Panel Data Regression and GMM Methodology**

However, there might still be the possibility of the loss of dynamic information even in panel data framework as the dependent variable may have something to do in explaining itself as well (Levine et al., 2000). To incorporate dynamics into the model, equations above can be rewritten as an AR (1) model in the following, that is

\[ y_{it} - y_{it-1} = \alpha_i + \beta y_{it-1} + \beta x_{it} + \mu_i + \epsilon_{it} \]  

where \( y_{it} \) is the logarithm of real per capita GDP, \( y_{it} - y_{it-1} \) is the rate of per capita income growth, \( y_{it-1} \) is the initial level of per capita

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**Table 1. Panel Unit Root Tests on Levels of Variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>IPS Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>-3.85</td>
</tr>
<tr>
<td>ivtgdp</td>
<td>-5.53</td>
</tr>
<tr>
<td>xmgdp</td>
<td>-4.34</td>
</tr>
<tr>
<td>ser</td>
<td>-4.45</td>
</tr>
<tr>
<td>of</td>
<td>-5.21</td>
</tr>
<tr>
<td>tour</td>
<td>-3.42</td>
</tr>
<tr>
<td>treceipt</td>
<td>-3.32</td>
</tr>
</tbody>
</table>

Variables are in natural logarithmic forms. The test statistic, calculated as the difference between the average \( t \)-value and the expected value, and adjusted for the variance, has a \( N(0,1) \) distribution under the null of non-stationarity, with large negative values indicating stationarity (Canning, 1999).
income, \( x_{it} \) represents a vector of explanatory variables, that is \( x = [ivgdp, ser, xmgdp, ef \text{ and } tour/treceipt] \). \( \mu_{it} \) is an unobserved country specific and time invariant effect, \( \varepsilon_{it} \) is the error term and the subscripts \( i \) and \( t \) represent country and time period respectively. \( \alpha_t \) is the period specific intercept terms to capture changes common to all countries. Equivalently, Equation (3) can be written as

\[
y_{it} = \alpha_t + (v + 1)y_{it-1} + \beta x_{it} + u_i + \varepsilon_{it}
\]

The above can also be written in first differences which in fact eliminate the firm specific and time-invariant component, \( \mu_{it} \).

\[
\Delta y_{it} = \Delta \alpha_t + (v + 1)\Delta y_{it-1} + \beta \Delta x_{it} + \Delta \varepsilon_{it}
\]

To overcome the problem of endogeneity as \( y_{t-1} \) might be endogenous to the error terms through \( \varepsilon_{it-1} \), use of the GMM estimators (Arellano & Bond, 1991, 1995) is thus made. The first step GMM estimator is used as it has been shown to result in more reliable inferences (Blundell & Bond, 1998).

**DISCUSSION OF RESULTS**

The results from estimating Equation (5) using the first step GMM estimator are contained in Table 2.

Referring to the robust estimates from Table 2 (column 1 and 2), the tourism development indicator implies that the tourism has been an important factor in explaining economic performance in island economies. The coefficient of the tourism indicator varies from 0.12 to 0.14, indicating a positive short term output elasticity of tourism. These results are consistent with the positive link found in the literature and particularly with earlier works on developing countries by Tosun (1999) and Gunduz and Hatemi (2005) for case of Turkey, Kim et al. (2006) for Taiwan, Eugenio-Martín et al. (2004) for Latin American countries. Interestingly our results tend to confirm the study of Brau et al. (2004, 2007) for a sample of small economies and particularly that of Durbarry (2002, 2004) for the case of the island of Mauritius.

It is noteworthy that the contribution of tourism to economic development of island economies is relative lower as compared to the classical ingredients of growth. In fact, based on its strong theoretical prediction, investment in physical capital (consistent with the findings of Dritsakis, 2004; Durbarry, 2004; Sinclair, 1998; Temple, 2001) is reported to have played the most important role (reported coefficient of 0.35). Openness, with a short term output elasticity of 0.21 appears to be another important element of growth with education having a slightly lesser growth effect. As such consistent with arguments made by Sen (1999) and Owen (1987), an improvement in the index of

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6 These short run elasticities are observed to be relatively smaller as compared to the long run values of fixed effects estimates (not reported) implying that these determinants may take some time to have their full potential effect on economic growth.
economic freedom would lead to an improvement in GDP of a typical island economy. Interestingly, the positive lagged value of the coefficient of the dependent variables in both cases denotes the presence of important dynamics in the tourism-growth hypothesis. This is in line with the findings of Durbarry (2004), Eugenio-Martín et al. (2004) and more recently Fayissa et al. (2007) for the case of developing countries. These results provide valuable insights and implications in assisting the development of small island states particularly in a world of constraints related to their smallness, remoteness, geographical dispersion,

Table 2. Dynamic Panel Data Estimation (First Step GMM estimator) Dependent variable dy (log difference of GDP per capita), 1995–2007

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Island Eco 'Tour'</td>
<td>Developing Eco 'Tour'</td>
<td>Developed Eco 'Tour'</td>
<td>Island Eco 'receipt'</td>
<td>Developing Eco 'receipt'</td>
<td>Developed Eco 'receipt'</td>
</tr>
<tr>
<td>Constant</td>
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<td>0.55</td>
<td>1.54</td>
<td>0.79</td>
<td>0.36</td>
<td>0.64</td>
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<tr>
<td></td>
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<td>(1.88)*</td>
<td>(1.08)</td>
<td>(1.26)</td>
<td>(1.37)</td>
</tr>
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<td>yt-1</td>
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<td>0.23</td>
<td>0.34</td>
<td>0.17</td>
<td>0.25</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>(2.15)**</td>
<td>(2.52)**</td>
<td>(2.43)**</td>
<td>(2.15)**</td>
<td>(2.19)**</td>
<td></td>
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<tr>
<td>divt</td>
<td>0.36</td>
<td>0.23</td>
<td>0.45</td>
<td>0.35</td>
<td>0.25</td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>(2.62)**</td>
<td>(2.36)**</td>
<td>(2.15)**</td>
<td>(3.14)**</td>
<td>(2.44)**</td>
<td>(2.43)**</td>
</tr>
<tr>
<td>dser</td>
<td>0.17</td>
<td>0.13</td>
<td>0.18</td>
<td>0.15</td>
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<td>0.13</td>
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<tr>
<td></td>
<td>(1.85)*</td>
<td>(1.96)*</td>
<td>(1.89)*</td>
<td>(1.97)*</td>
<td>(1.95)*</td>
<td>(1.96)*</td>
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<td>0.34</td>
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<tr>
<td></td>
<td>(1.94)*</td>
<td>(1.98)*</td>
<td>(1.98)*</td>
<td>(2.21)**</td>
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<td>(1.97)*</td>
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<td>def</td>
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<td>0.11</td>
<td>0.06</td>
<td>0.12</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>(1.87)*</td>
<td>(1.79)*</td>
<td>(1.87)*</td>
<td>(1.95)*</td>
<td>(1.77)*</td>
<td>(1.96)*</td>
</tr>
<tr>
<td>dtour</td>
<td>0.12</td>
<td>0.06</td>
<td>0.064</td>
<td>(1.95)*</td>
<td>(1.95)*</td>
<td>(1.96)*</td>
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<tr>
<td>dtreceipt</td>
<td>0.14</td>
<td>0.033</td>
<td>0.08</td>
<td>(2.04)*</td>
<td>(1.87)*</td>
<td>(1.89)*</td>
</tr>
</tbody>
</table>

**Diagnosis tests**

Sargan Test of Overidentifying restrictions

- prob > chi2 = 0.22
- prob > chi2 = 0.22
- prob > chi2 = 0.23
- prob > chi2 = 0.27
- prob > chi2 = 0.16
- prob > chi2 = 0.35

Arellano-Bond test of 1st order autocorrelation

- prob > chi2 = 0.13
- prob > chi2 = 0.18
- prob > chi2 = 0.15
- prob > chi2 = 0.23
- prob > chi2 = 0.10
- prob > chi2 = 0.16

Arellano-Bond test of 2nd order autocorrelation

- prob > chi2 = 0.45
- prob > chi2 = 0.37
- prob > chi2 = 0.25
- prob > chi2 = 0.08
- prob > chi2 = 0.289
- prob > chi2 = 0.37

Hausman Statistics

- 1.7
- 0.98
- 1.95
- 2.14
- 1.76
- 1.65

Wald test of joint significance

- 18.43
- 9.43
- 12.24
- 10.44
- 14.55
- 12.23

The small letters denotes variables in natural logarithmic, $d$ denotes variables in first difference and the heteroskedastic-robust z-values are in parentheses.

At 5% level, the value of the hausman statistic is less than the critical, implying that we accept the null hypothesis of strict exogeneity.

The Wald test passes the test of joint significance at 1% level.

* Significant at 10%.; ** Significant at 5%.; *** Significant at 1%.
vulnerability to natural disasters and to exogenous economic and financial shocks, small domestic market, lack of natural resources and fragility of their ecosystems, isolation from markets, and dependence on imports among others.

As compared to the results of the developing and developed countries samples, it can be observed that tourism appear to play a relatively more important role in explaining growth of island economies as judged by the higher coefficient of the tourism variables of column 1 and 4. Same was found when analyzing the results from the fixed effect model. This confirms the fact that tourism development on island economies may have comparatively higher growth effects. The other explanatory variables are theoretically consistent although they vary in their magnitudes.

The consistency of the estimation depends on whether lagged values of the endogenous and exogenous variables are valid instruments in our regression. Also, this methodology assumes that there is no second-order autocorrelation in the errors, therefore a test for the previous hypotheses is needed. We have thus conducted a test for autocorrelation and the Sargan test for over-identifying restrictions as derived by Arellano and Bond (1991). Failure to reject the null hypothesis related to Sargan Test (confirmed by the Hansen J Statistic) of Over-identifying restrictions (suggesting no invalid over-identifying restrictions) and the Arellano-Bond test of 2nd order autocorrelation (validating the use of the suitably lagged endogenous variable as instrument) give support to a correct model specification. To note that first differencing of the variables naturally generates first order autocorrelation; hence we test for second order autocorrelation in the error term. The model also passes the Wald test, a test for jointly significance. A Hausman test was further used to test for the strict exogeneity of all regressors in the model and hence the appropriateness of our model.

Causality Test and Reverse Effects

Existing work on the Tourism-growth relationship using panel data has only scarcely dealt with the reverse effect of growth and development level on tourism, particularly for the case of island samples. We further conduct a causality analysis of the mutual relationship between the two variables (and subsequently for a series of other pair of variables) using recent theoretical developments in Granger causality methods that have made tests using relatively short time series possible through the use of panel data (see also Hurlin & Venet, 2001; Larrain, Reisen, & Maltzan, 1997). This technique is thus used to conduct a dedicated test of both the existence as well as direction of any causality between tourism and growth for our sample of island countries.

We employ the Hurlin and Venet (2001) panel data Granger causality procedure. The introduction of a panel data dimension permits the use of both cross-sectional and time-series information to test any causality relationships between two variables. Indeed by increasing the number of observations, this procedure raises the degrees of freedom.
and improves the efficiency of Granger causality tests. Using Hurlin and Venet procedure we test the homogenous non-causality hypothesis, that is the null hypothesis states non-existence of causal relationships. If this null is rejected, there is evidence of Granger causality. In the general case, the test statistic is computed by the following Wald test proposed by Hurlin and Venet (2001),

$$W = \frac{(RSS_2 - RSS_1)/(Np)}{RSS_1[NT - N(1 - p) - p]}$$

where $N$ is the number of individuals (countries), $T$ is the number of periods, $SN$ denotes the total number of observations, $p$ is the optimum lag length, $RSS_2$ denotes the restricted sum of squared residuals obtained under the null hypothesis, and $RSS_1$ is the unrestricted sum of squared residuals computed. The above procedure was applied to our data and the results are summarized in the Table 3.

<table>
<thead>
<tr>
<th>Hypothesis (H1)</th>
<th>W Statistic</th>
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<tr>
<td>TOUR $\rightarrow$ IVTGDP</td>
<td>2.453***</td>
</tr>
<tr>
<td>Y $\rightarrow$ TOUR</td>
<td>2.547***</td>
</tr>
<tr>
<td>K $\rightarrow$ IVTGDP</td>
<td>2.875***</td>
</tr>
<tr>
<td>Y $\rightarrow$ IVTGDP</td>
<td>1.879***</td>
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<tr>
<td>IVTGDP $\rightarrow$ TOUR</td>
<td>2.545***</td>
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<tr>
<td>TOUR $\rightarrow$ IVTGDP</td>
<td>1.856***</td>
</tr>
<tr>
<td>EF $\rightarrow$ TOUR</td>
<td>2.214***</td>
</tr>
</tbody>
</table>

The symbol ‘$\rightarrow$’ indicates direction on Granger Causality.

*** Significant at 5%.

Our findings can be summarised as follows. Tourism is confirmed to granger cause economic growth ($Y$), and interestingly a reverse causation exists in that output level appear to be a determinant of tourism as well confirming the level of development may be important to attract tourist as well and that tourism and economic development reinforce each other and this is a valuable implication for island economies suggesting some element of ‘spiral effects’. This is consistent with theoretical discussion and results obtained from Kim et al. (2006) and Lee (2008). The level of investment tends to granger cause tourism and thus is an indication that the former matters and that it is increasing tourism capacity. Interestingly tourism is also associated with increased private investment suggesting that more tourists encourage more investment and probably in the tourism infrastructure and industry. Thus island economies could benefit important injection of capital from the private sector, including

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7 This procedure is consistent with a standard Granger causality where the variables entered into the system need to be time-stationary.
foreign direct investment along successful tourism development thus acting as a good support to further development of both the tourism sector and the economy at large with important effects on social elements as well. The presence of bi-causality between domestic inward investment and income level of the country is also noted and finally social, political and economic freedom is yet another element for successful tourism development.

CONCLUSIONS

This paper attempted to supplement the literature by investigating the empirical link between tourism development and economic growth for a sample of island economies over the period 1990–2007. The study accounted for the possibility of dynamics in the tourism-growth link through the use of dynamic panel data framework, namely the Generalised Methods of Moments (GMM) method.

Results from the analysis revealed that tourism development is an important factor in explaining economic performance in island economies and the results are consistent with earlier works on developing countries by Gunduz and Hatemi (2005) and Tosun (1999) for case of Turkey, Kim et al. (2006) for Taiwan, Eugenio-Martín et al. (2004) for a sample of Latin American countries, Brau et al. (2004, 2007) and particularly that of Durbary (2004) for the case of the island of Mauritius. Interestingly the presence of dynamics in the tourism-growth hypothesis is reported. Comparative analysis with samples of developing and developed countries revealed that tourism plays a relatively more important role in explaining growth of island economies confirming the fact that tourism development on island economies may have comparatively higher growth effects. Further analysis using panel granger causality test validates the fact that tourism causes economic growth and interestingly a reverse causation exists in that output level appears to be a determinant of tourism as well confirming the level of development may be important to attract tourists as well and that tourism and economic development reinforce each other. As such a bi-causal effect between tourism and investment is observed and finally social, political and economic freedom appears to be another element for successful tourism development.

Tourism remains a good development strategy as islands have unique natural, cultural or social attractiveness that that usually valorized to a large extent through tourism. These are important counter elements to constraints associated with the smallness, remoteness, geographical dispersion, vulnerability to natural disasters and to exogenous economic and financial shocks dimensions. An overall broad policy implication which may be drawn from this study is that island economies can improve their economic growth performance, not only by investing on the traditional sources of growth such as
investment in physical and human capital and trade which remain
the main ingredients, but also by strategically harnessing the contribu-
tion the tourism industry.

Specifically it can be recommended that National development
strategies must be therefore be developed with tourism playing a key
position in policy development. This may imply more emphasis on
the inter-sectoral linkages and integration of tourism planning into
overall national development strategies. To promote tourism it is nec-
essary that appropriate incentive plans and procedures to facilitate
tourism and the operators are in place, this could be in the form of ba-
sic infrastructure such as roads, better and more efficient air ports (gi-
gen the remoteness nature of islands and that most tourist travel by
air), good transport and communication system and tax incentives to
the hotels and other tourism related industries. Other infrastructure
planning development related to good energy and sanitary aspects
are also essential to support tourism development plans. Moreover,
government also ensures the security of both foreign and domestic
tourists.

It is believed that close collaboration of governments with national
tourism industry actors at large to support tourism development strat-
egies is required and also that policy makers should adopt sustainable
tourism policies for a desirable sustainable tourism as well as economic
development.

APPENDIX. 1

See Table A.1.

APPENDIX. 2

List. of Island Economies

The Bahamas, Antigua and Barbuda, Bahrain, Barbados, Belize, Cy-
rus, Dominican Republic, Fiji, Grenada, Guinea Bissau, Guyana, Haiti,
Jamaica, Malta, Mauritius, Papa New Guinea, Seychelles, Singapore, Sri
Lanka, Trinidad and Tobago.

List. of Developing Economies

Bangladesh, Botswana, Brazil ,Cyprus, China ,Egypt, Ethiopia, India,
Kenya, Luxembourg, Malaysia, Mexico, Pakistan, Nigeria, South Africa,
Swaziland, Thailand, Uganda, Zambia.

List. of Developed Economies

Australia, Canada, France, Germany, Italy, Norway, Spain, Switzer-
land, United Kingdom, United States.

<table>
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<tr>
<th>Islands</th>
<th>International Tourist Arrival, '000</th>
<th>Travel &amp; Tourism Economy, USD bn</th>
<th>Travel &amp; Tourism Direct Industry, USD bn</th>
<th>Travel and Tourism Employment, '000</th>
<th>Travel and Tourism Government Expenditure, USD bn</th>
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