Environmental Science and Pollution Research (2019) 26:14393–14399
https://doi.org/10.1007/s11356-019-04750-w

RESEARCH ARTICLE

# Estimating the role of climate changes on international tourist flows: evidence from Mediterranean Island States

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Received: 11 February 2019 / Accepted: 4 March 2019 / Published online: 13 March 2019


## Abstract

This article examines the role of climate change on tourist flows to Malta, Cyprus (north), and Cyprus (south) which are major tourist destinations in the Mediterranean. Results from time series analyses reveal that climate change positively impacts on foreign tourist flows to these island states. Thus, this finding is reasonable where we argue that global warming leads to increases in international tourist arrivals to small island states. This paper has also found statistically significant effects of overall energy consumption on foreign tourist arrivals to Malta and Cyprus revealing that energy efficiency policies are essential in small island states.

**Keywords** Climate change · Carbon emissions · Tourism · Islands

## Introduction

Researchers have been investigating the links among energy consumption, environmental pollution, and economic growth for a long time; however, the links of environmental quality and energy consumption within sectors of the economy catch less attention including tourism development. Also, international tourism has been examined in terms of the growth of an engine in several countries (Katircioglu 2009). Tourism development boosts both economy and other segments including energy capacity; however, it increases the level of pollution due to the expansion in touristic investments, tourist arrivals, and tourism-related economic activities (Katircioglu 2011, 2014). Increases in tourism issues lead to rise in the demand for energy for diverse functions such as accommodation, catering, transportation, and the administrative issues of tourist attractions (Becken et al. 2001; Becken et al. 2003; Gössling 2002) and this may lead to environmental degradation (Xuchao et al. 2010). It is also stated that hotels consume a great deal of energy in many countries (Xuchao et al. 2010).

Previous studies started to consider the effects of tourism on environmental pollution and/or climate change in the last decade. For example, Katircioglu (2014) examined the impacts of tourism growth in terms of climate change in Turkey and found that tourism growth yields increases in both energy use and climate change. Katircioglu et al. (2014) have also examined the impacts of tourism growth on energy consumption and climate change in Cyprus which is a tourist destination island in the Mediterranean, and have concluded that tourism development is a catalyst for rises in energy consumption and carbon emissions. Lee and Brahmasrene (2013) have searched the effects of tourism on economic growth and $CO_2$ emissions in European Union (EU) countries via panel data econometric procedures and have stated that tourism undergoes a highly negative influence on $CO_2$ emissions.

Again, previous studies have studied on the effects of tourism development on climate change as mentioned in the previous paragraphs; however, a new debate is available to search the effects of climate change or global warming on international tourist flows. Amelung et al. (2007), Maddison (2001), and Scott and McBoyle (2001) argue that tourism is a climate-

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dependent industry while Dogru et al. (2019) suggest that this industry is highly vulnerable to climate changes. Atzori et al. (2018) using a quantitative survey find that tourists respond significantly to climate changes. On the other hand, small islands are attractive destinations for international tourists owing to warming in addition to distinctive characteristics of islands (Bicak et al. 2006). Millions of tourists visit tourist destinations mainly small islands as they terminate cold non-island countries during summer seasons. Thus, this article proposes a new research question if climate changes would significantly influence tourist arrivals to small island states (Javid and Katircioglu 2017).

Against this backdrop in the current literature and unlike previous studies, this article studies on the effects of climate change on international tourist flows to three major Mediterranean Island States, namely Malta, Cyprus (north), and Cyprus (south). These three island states are major tourist destinations in the Mediterranean; Malta attracted about 2.274 million tourists in 2017 (World Bank 2018), while Cyprus (north) attracted about 1.734 million tourists (SPO, 2018), and Cyprus (south) attracted about 3.652 million tourists (World Bank 2018) respectively. The whole Cyprus island attracted about 5.386 million tourists in 2017. On the other hand, as argued by Atzori et al. (2018), beach tourism is very sensitive to climate change; with this respect, small islands become attractive better than non-island states for such research nexus according to our argument. Thus, it would be interesting to search for the role of climate changes on international tourist flows to these islands. Our research question is that climate changes significantly positively impact on tourist flows to small islands. In order to test the validity of this research question, this study is organized as follows:

"Theoretical setting" attempts to identify the theoretical setting of the current study; "Data and methodology" presents the data and methodology; "Results and discussion" displays the empirical results and discussion; and "Conclusion" is the conclusion of the study.

## Theoretical setting

Tourism is proxied extensively by two measures: (1) international tourist arrivals visiting and accommodating in the host countries and (2) international tourism receipts (Katircioglu et al. 2018a, b; Munandar 2017; Perkov et al. 2016; Katircioglu 2009, 2010). Thus, this study will use international tourist arrivals as a proxy for tourism volume based on data availability. On the other hand, climate change is mostly identified by carbon dioxide emissions (kt) ($CO_2$) in many studies in the relevant literature (Katircioglu et al. 2018c; Katircioglu and Katircioglu 2018a, b; Anatasia 2015; Kalayci and Koksal 2015; Kapusuzoglu 2014; Borhan and Ahmed 2012). Again, in parallel to such studies, this study will use $CO_2$ emissions as a proxy of climate change. The main research question of this study is that climate change is likely to affect tourist flows to countries. It is here argued that climate levels in tourist destinations are significant determinants of tourist decisions for visiting targeted destinations. Therefore, the volume of foreign visits to countries will be affected by these decisions owing to climate changes.

Literature studies have shown that energy consumption and income level of countries are drivers of carbon emission levels (Cetin and Ecevit 2017; Ozcan and Ari 2017; Istaiteyeh 2016). Thus, overall energy consumption and gross domestic product (GDP) are also considered in the theoretical model construction of this study. Previous studies have also shown that capital and labor force of countries are significant determinants of not only income but also touristic investments in the countries (Turekulova et al. 2016; Bayram 2007). So, capital and labor also have been augmented into theoretical modeling of the current study. Finally, exchange rates are major determinants of international tourist flows and omitting this variable would lead to omitted variable problems and biased results in estimation (Katircioglu 2009). Hence, the following modeling of climate change and tourism nexus is then proposed in the present study:

$$T_{\mathrm{t}} = f\left(y^{\beta_1}, K^{\beta_2}, L^{\beta_3}, \mathrm{CO}_{2t}^{\beta_4}, E_t^{\beta_5}, \mathrm{RER}^{\beta_6}\right) \quad (1)$$

where $T$ stands for tourist arrivals, $y$ is real income, $K$ is capital, $L$ is labor force, $CO_2$ is carbon dioxide emission (kt), $E$ is overall energy consumption (kt of oil equivalent), and RER is real exchange rates. The symbols $\beta_1$, $\beta_2$, $\beta_3$, $\beta_4$, $\beta_5$, and $\beta_6$ are regression coefficients of regressors respectively.

Equation (1) can be revised in logarithmic form in order to obtain growth effects in regression analyses (Sodeyfi and Katircioglu 2016):

$$\ln T_t = \beta_0 + \beta_1 \ln y_t + \beta_2 \ln K_t + \beta_3 \ln L_t + \beta_4 \ln \mathrm{CO}_{2t} + \beta_5 \ln E_t + \beta_6 \ln \mathrm{RER}_t + \varepsilon_t \quad (2)$$

where the terms "ln" stand for the logarithmic base of series and ε is the error term.

The econometrics theory states that regress and in Eq. (2) which is $\ln T_{\mathrm{t}}$ will not react to its long-term equilibrium level after changes in its regressors (Katircioglu et al. 2017); hence, the speed of convergence between the short-term and the long-term levels of $\ln T_{\mathrm{t}}$ should be then estimated via the following error correction model:

$$\Delta \ln T_t = \beta_0 + \sum_{i=1}^{n} \beta_1 \Delta \ln T_{t-j} + \sum_{i=0}^{n} \beta_2 \Delta \ln y_{t-j} + \sum_{i=0}^{n} \beta_3 \Delta \ln K_{t-j} + \sum_{i=0}^{n} \beta_4 \Delta \ln L_{t-j} + \sum_{i=0}^{n} \beta_5 \Delta \ln \mathrm{CO}_{2t-j} + \sum_{i=0}^{n} \beta_6 \Delta \ln E_{t-j} + \sum_{i=0}^{n} \beta_7 \Delta \ln \mathrm{RER}_{t-j} + \beta_8 \varepsilon_{t-1} + \mathrm{u}_t \quad (3)$$

where Δ represents changes in series and $\varepsilon_{t-1}$ is the one period lagged error correction term (ECT), which is predicted from

Eq. (2). The ECT in Eq. (3) then indicates how fast difference between the short-term and the long-term levels of $\ln T_t$ is eliminated each period. The supposed sign of ECT is negative by theory (Karacaer and Kapusuzoglu 2010).

## Data and methodology

### Data

This article focused on three major small islands of the Mediterranean Sea with three different annual data sets and periods. Data for Malta ranges from 1970 to 2014, for Cyprus (north) from 1977 to 2014, and for Cyprus (south) from 1960 to 2014 which are all based on data availability from the related sources and databases. Tourist arrivals ($T$) to Malta has been gathered from Tourism Authority Service of Malta (2018) in Malta; tourist arrivals to Cyprus (north) have been gathered from State Planning Organization (2018) of Cyprus (north); and tourist arrivals to Cyprus (south) have been gathered from Statistical Service (2018) of Cyprus (south). Gross domestic product ($y$), gross fixed capital formation ($K$), and real exchange rates (RER) are at constant 2010 USD prices and have been gathered from World Bank (2018) for Malta and Cyprus (south) while they have been gathered from State Planning Organization (2018) for Cyprus (north). Finally, labor force ($L$) and overall energy consumption ($E$) have been gathered from World Bank (2018) (kt of oil equivalent) for Malta and Cyprus (south) while they have been gathered from State Planning Organization (2018) for Cyprus (north). It is important to mention that owing to data availability, energy variable of Cyprus (north) has been proxied by two series: (1) overall electric consumption (kw/s) and (2) overall oil consumption (million tons).

### Methodology

Prior to econometric estimations, unit root tests for stationary nature of series needs to be investigated. Therefore, Phillips

**Table 1** Phillips-Perron unit root tests

| | Statistics (level) | | | Statistics (first difference) | | | Conclusion |
|---|---|---|---|---|---|---|---|
| | $PP_T$ | $PP_I$ | $PP_N$ | $PP_T$ | $PP_I$ | $PP_N$ | |
| Malta | | | | | | | |
| Ln$T$ | − 1.426 | − 3.183** | 1.915 | − 4.824* | − 4.250* | − 3.717* | I (0) |
| ln$CO_2$ | − 2.584 | − 1.688 | 4.340 | − 22.539* | − 9.604* | − 7.628* | I (1) |
| Ln$y$ | − 1.412 | − 2.069 | 4.556 | − 2.753 | − 2.228 | − 1.226 | – |
| ln$K$ | − 3.142 | − 2.560 | − 0.451 | NA | − 1.936 | − 2.508** | I (1) |
| ln$L$ | − 1.143 | − 2.204 | 3.642 | − 2.382 | − 1.890 | − 1.993** | I (1) |
| ln$E$ | − 2.326 | − 1.516 | 3.007 | − 9.588* | − 9.398* | − 8.819* | I (1) |
| lnRER | − 1.519 | − 2.521 | − 1.203 | − 3.030 | − 2.587 | − 2.600** | I (1) |
| Cyprus (north) | | | | | | | |
| Ln$T$ | − 2.839 | 0.199 | 3.110 | − 5.117* | − 5.145* | − 4.259* | I (1) |
| ln$CO_2$ | − 1.901 | − 3.501** | 1.709 | − 13.557* | − 9.300* | − 8.558* | I (0) |
| ln$y$ | − 2.713 | − 0.224 | 1.414 | − 4.437* | − 4.440* | − 4.227* | I (1) |
| ln$K$ | − 2.337 | − 0.686 | 1.005 | − 4.609* | − 4.661* | − 4.599* | I (1) |
| ln$L$ | − 2.422 | − 1.565 | 4.289 | − 5.606* | − 5.625* | − 4.129* | I (1) |
| lnElectric | − 4.422* | − 0.909 | 11.178 | − 8.339* | − 8.650* | − 3.341* | I (0) |
| lnPetrol | − 1.915 | − 0.643 | 3.274 | − 3.788** | − 3.877* | − 3.478* | I (1) |
| lnRER | − 2.715 | − 1.951 | − 0.255 | − 5.167* | − 5.213* | − 5.283* | I (1) |
| Cyprus (south) | | | | | | | |
| Ln$T$ | − 2.335 | − 2.145 | 2.257 | − 13.448* | − 9.892* | − 8.779* | I (1) |
| ln$CO_2$ | 0.771 | − 2.789*** | 2.680 | − 9.026* | − 6.057* | − 5.293* | I (0) |
| ln$y$ | − 1.084 | − 5.055* | 3.910 | − 5.369* | − 3.902* | − 3.345* | I (0) |
| ln$K$ | − 3.144 | − 3.942* | 0.644 | − 6.716* | − 6.247* | − 6.324* | I (0) |
| ln$L$ | 0.837 | − 2.263 | 8.959 | − 3.797** | − 3.085** | − 1.068 | I (1) |
| ln$E$ | 0.101 | − 3.131** | 1.960 | − 8.078* | − 5.293* | − 4.934* | I (0) |
| lnRER | − 2.253 | − 1.930 | − 0.512 | − 4.375* | −4.322* | −4.379* | I (1) |

$PP_T$ represents the model with the trend and intercept; $PP_I$ is the model with an intercept but without trend; $PP_N$ is the model without intercept and trend. (*), (**), and (***) denote the rejection of the null hypothesis at the 1, 5, and 10% levels respectively. Tests for unit roots were carried out in E-VIEWS 10.0

**Table 2** The ARDL long-term coefficients and error correction terms (Malta)

| Dep.var.: lnTour | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Intercept | 18.061** | 15.600** | 18.916* | 19.950** |
| | (3.690) | (2.606) | (4.436) | (3.196) |
| ln*y* | − 2.908** | 1.032* | 1.216* | 1.341* |
| | (− 3.286) | (7.955) | (15.319) | (6.747) |
| ln*K* | − 2.862** | − 0.378** | − 0.570** | − 0.672** |
| | (− 3.006) | (− 2.578) | (− 3.724) | (− 3.259) |
| ln*L* | − 11.746** | − 2.317** | − 2.919* | − 3.205** |
| | (− 3.343) | (− 3.334) | (− 6.572) | (− 3.556) |
| ln$CO_2$ | | 0.527* | − 0.127 | − 0.382 |
| | | (5.130) | (− 1.324) | (− 1.367) |
| ln*E* | | | 0.718* | 0.947* |
| | | | (6.672) | (4.095) |
| lnRER | | | | 0.029 |
| | | | | (0.083) |
| Lag order | 0,3,3,3 | 3,2,1,2,1 | 2,1,2,2,0,1 | 2,1,2,2,2,2,2 |
| Bounds *F* Stat. | 5.854c | 5.457c | 6.145c | 6.789c |
| $R^2$ | 0.851 | 0.965 | 0.976 | 0.989 |
| $ECT_{t-1}$ | − 0.211* | − 0.250* | − 0.428* | − 0.670* |

(*) and (**) denote the rejection of the null hypothesis at 1 and 5% levels respectively. Numbers in parentheses are *t* ratios. The term "c" stands for the case that bounds *F* statistic is greater than *F* III test statistic (with unrestricted intercept and no trend) from Pesaran et al. (2001)

and Perron (1988) unit root tests are adapted in this study with this respect. Expecting that regressors might be of mixed order of integration as a result of PP (Phillips and Perron 1988) unit root tests, bounds tests for level relationships under the autoregressive distributed lag (ARDL) methodology which were developed by Pesaran et al. (2001) are adapted in the study. Bounds *F* tests by Pesaran et al. (2001) suggest the null hypothesis of no level relationships in the proposed models (namely Eq. 2 in this study). Once level (long-term) relationships are obtained, then long-term (Eq. 2) coefficients through the ARDL approach will be used to estimate in this study. Through this methodology, a mixed order of integration for regressors will be allowed in Eqs. (2) and (3) of the current study.

## Results and discussion

Results of PP (Phillips and Perron 1988) unit root tests have been presented in Table 1. It is important to note that although the ARDL methodology allows for a mixed order of integration in regressors in Eq. (2), if dependent variables are integrated of the first order, thereafter, bounds *F* tests can be run for estimating long-term coefficients (Pesaran et al. 2001; Katircioglu 2009). Table 1 shows that dependent variable, ln*T*, in Eq. (2) is non-stationary at level forms but becomes stationary at first differences for the selected islands (Malta,

**Table 3** The ARDL long-term coefficients and error correction terms (North Cyprus)

| Dep.var.: ln*T* | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Intercept | − 16.336** | 45.532** | 13.722*** | 36.463** | 16.571 |
| | (− 3.123) | (2.850) | (1.713) | (3.403) | (1.638) |
| ln*y* | 0.557 | − 0.018 | 0.517 | 0.142 | 0.189 |
| | (0.786) | (− 0.045) | (1.148) | (0.338) | (0.414) |
| ln*K* | − 0.017 | − 0.291 | − 0.656** | − 0.920* | − 0.650** |
| | (− 0.028) | (− 1.494) | (− 2.047) | (− 4.755) | (− 2.602) |
| ln*L* | 2.246* | − 3.704** | − 1.579 | − 4.946** | − 1.746 |
| | (3.768) | (− 2.640) | (− 1.646) | (− 3.439) | (− 1.229) |
| ln$CO_2$ | | 1.440* | 0.707** | 0.070 | 0.275 |
| | | (4.514) | (2.912) | (0.322) | (1.182) |
| lnElectric | | | 1.827** | 2.711* | 2.339** |
| | | | (3.277) | (4.394) | (3.361) |
| lnPetroleum | | | | 1.564** | 0.149 |
| | | | | (2.967) | (0.284) |
| lnRER | | | | | − 0.676 |
| | | | | | (− 1.438) |
| Lag order | 2,2,0,0 | 2,2,0,0 | 2,0,3,2,0,3 | 2,3,3,3,3,3,3 | 2,2,2,2,2,2,2,0 |
| Bounds *F* Stat. | 6.654c | 6.776c | 7.547c | 7.045c | 6.490c |
| $R^2$ | 0.402 | 0.766 | 0.749 | 0.983 | 0.952 |
| $ECT_{t-1}$ | − 0.240** | − 0.697* | − 0.625* | − 0.592* | − 0.672* |

(*), (**), and (***) denote the rejection of the null hypothesis at the 1, 5, and 10% levels respectively. Numbers in parentheses are *t* ratios. The term "c" stands for the case that bounds *F* statistic is greater than *F* III test statistic (with unrestricted intercept and no trend) from Pesaran et al. (2001)

Cyprus (north), and Cyprus (south)). Thus, it is concluded that tourist arrivals to these island states are non-stationary and are integrated of order one, I (1). Among regressors, results in Table 1 reveal that ln$CO_2$ for Cyprus (north) is integrated of order zero, I (0), while ln$CO_2$, lnGDP, lnGCF, and ln$E$ for Cyprus (south) are integrated again of order zero, I (0). The rest of the series are non-stationary and I (1) according to PP (Phillips and Perron 1988) unit root test results.

In the next step, Tables 2, 3, and 4 present bounds $F$ tests result through the ARDL methodology for Eq. (2). It is clearly seen that there are computed $F$ values in the case of each island state which are statistically significant using model options from Pesaran et al. (2001). Thus, the null hypothesis of no level relationship in Eq. (2) is strongly rejected and its alternative of a level relationship is accepted for Malta, Cyprus (north), and Cyprus (south). In this case, further steps for estimating long-term coefficients in Eq. (2) can be proceeded.

Beta coefficients in Eq. (2) have been estimated by using the ARDL approach that results are provided again in Tables 2, 3, and 4 for each island state. Furthermore, error correction terms (ECTs) from Eq. (3) have been also provided in these tables. A total of four model options have been estimated which start from a narrow model to the extended one by adding related regressors gradually. This is done to check the consistency of regression results.

Firstly, in the case of Malta in Table 2, it is observed that the coefficient of carbon emissions (ln$CO_2$) is positively significant for tourist arrivals ($\beta = 0.527$, $p < 0.01$) in model option (2) when energy consumption and exchange rates are not added; however, this coefficient becomes insignificant in the later model options with extended regressors. Having a positively significant intercept in model option (2) in Table 2 supports the argument that with no change in regressors, tourist arrivals will continue to increase over time. The coefficients of capital and labor are usually and negatively significant in Table 2 denoting that downturn trend and volatility in capital and labor are not obstacles for tourist flows to Malta. The coefficients of real income (GDP) are generally positively significant as expected. But, interestingly, Table 2 shows that real exchange rates do not exert statistically significant effects on tourist flows to Malta. The coefficients of ECTs are negatively significant and they tend to increase as more regressors are added into regressions. In model option (4), the ECT term is − 0.670 ($\beta = -0.670$, $p < 0.01$) revealing that tourist arrivals to Malta react toward long-term path by 67.0% speed of adjustment (considerably high) every year through the channels of regressors included in Eq. (2).

Table 3 presents estimations of long-term coefficients as well as ECTs for the case of Cyprus (north). Similar to findings in the case of Malta, the coefficients of capital and labor are generally and negatively significant for tourist arrivals to Cyprus (north). The coefficients of ln$CO_2$ are positively significant denoting that tourist arrivals are not negatively influenced by the level of carbon emissions. Having positively significant intercept supports this finding again similar to those in the case of Malta. Again, exchange rates in Cyprus (north) do not significantly impact on tourist arrivals. Having insignificant coefficients of real exchange rates in the cases of Malta and Cyprus (northern) might be due to high import dependency (thus, irresponsiveness of the economy to changes in exchange rates) and success in attracting international tourists no matter what level of exchange rates would be. The coefficients of ECTs are again negatively significant and considerably high similar to those in the case of Malta.

Finally, Table 4 presents estimations of long-term coefficients and ECTs for the case of Cyprus (south). Results show that the coefficient of capital is generally negatively significant again; however, the coefficients of labor are not statistically significant. Similar to findings for Malta and Cyprus (north), the coefficients of ln$CO_2$ emissions are positively significant in general and again having positively significant intercept supports this finding again similar to those in the cases of Malta and Cyprus (north). Unlike the findings in the cases of Malta and Cyprus (north), the coefficients of real exchange rates are positively significant for Cyprus (south) in model option (4) arguing that international prices are drivers for

**Table 4** The ARDL long-term coefficients and error correction terms (south Cyprus)

| Dep.var.: lnTour | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Intercept | 9.077* | 7.100** | 3.516 | 4.770** |
| | (6.994) | (3.256) | (0.475) | (2.787) |
| ln$y$ | 0.443** | 0.665** | 2.329** | − 2.843** |
| | (2.766) | (2.593) | (2.446) | (− 2.267) |
| ln$K$ | − 0.250* | − 0.241* | − 0.379* | 0.053 |
| | (− 8.724) | (− 8.209) | (− 6.654) | (− 0.630) |
| ln$L$ | 0.043 | − 0.120 | − 1.561 | − 0.288 |
| | (0.211) | (− 0.476) | (− 1.257) | (− 0.209) |
| ln$CO_2$ | | 0.153 | 1.313*** | 2.248** |
| | | (− 1.073) | (1.934) | (2.355) |
| ln$E$ | | | 0.442 | − 0.039 |
| | | | (0.639) | (− 0.102) |
| lnRER | | | | 2.415* |
| | | | | (5.383) |
| Lag order | 3,0,2,2 | 3,0,2,20 | 2,2,2,1,1,1 | 0,2,2,2,1,2,2 |
| Bounds $F$ Stat. | 6.045c | 5.997c | 6.784c | 7.065c |
| $R^2$ | 0.929 | 0.936 | 0.944 | 0.992 |
| $ECT_{t-1}$ | − 0.582* | − 0.647* | − 0.62* | − 0.780* |

(*) and (**) denote the rejection of the null hypothesis at 1 and 5% levels respectively. Numbers in parentheses are $t$ ratios. The term "c" stands for the case that bounds $F$ statistic is greater than $F$ III test statistic (with unrestricted intercept and no trend) from Pesaran et al. (2001)

tourist arrivals. Similar findings in Table 4 have been obtained for ECTs compared to those in Tables 2 and 3.

## Conclusion

This empirical article has examined the role of climate change on tourist arrivals in three major tourist destination island states in the Mediterranean, namely Malta, Cyprus (north), and Cyprus (south). Our findings support long-term positive effects of climate change as proxied by carbon dioxide emissions on tourist flows to these island states. This major finding reveals that global warming leads international tourists to visit small islands rather than non-island states. Thus, the results of this study are not surprising with this respect. In this study, we propose that global warming around the world would increase foreign tourist arrivals to tourist island destinations; thus, island states are expected to adapt energy efficiency policies in tourist investments such as investing on green energy projects where this article also found that overall energy consumption exerts positive effects on tourist arrivals revealing that an expansion in traditional energy consumption will be positively associated with tourist flows. This way, expansion in tourist flows will not lead to pollution via energy consumption. Hereby, we propose that further studies can be done for the cases of non-island states for comparing with the results of this study.

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