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The effect of globalization, income and tourism on environment: An empirical analysis

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Abstract
This study investigates the impact of globalization, real income, and tourism on the environment in top 10 destinations that attract the most tourists, using panel unit root, panel cointegration, and panel cointegration estimators for the period between 1995 and 2014. Panel cointegration test results show that the series moves together in the long run. According to the long-run panel estimator results, an increase in real income negatively affects the environment in China, France, Spain, Thailand, and the UK. Tourism decreases environmental degradation in Germany, Italy, the UK, and the United States. Globalization reduces environmental degradation in France and the UK. The short-run panel estimator shows that an increase in real income in all countries, except China, increases environmental degradation. Tourism decreases environmental degradation in Mexico and increases it in Spain. Finally, globalization contributes to the reduction of environmental degradation in Italy.

Keywords: globalization, tourism, real income, environmental degradation, panel data analysis

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1. Introduction

The environment plays a central role in maintaining uninterrupted and healthy functioning of daily life activities (Hosseini and Soltani, 2011; Sun et al., 2018). However, environmental quality degradation, due to social and economic activities, has started to seriously threaten all areas of life (Sani et al., 2020; Shengjuan and Jingping, 2011; Warford and Partow, 1989). The United Nations defines environmental degradation as 'deterioration in environmental quality from ambient concentrations of pollutants and other activities and processes, such as improper land use and natural disasters' (United Nations, 1997). Environmental degradation stems from industrial production and consumption activities (Nasir et al., 2021; Ozcan et al., 2020; Sharif et al., 2020a). In this context, the industrial revolution was a turning point in accelerating this degradation (Burnete and Choomta, 2015; Maneejuk et al., 2020; Munir and Riaz, 2020). Carbon dioxide (CO_2) emissions are one of the main indicators of environmental degradation (Alvarado et al., 2018; Asongu and Odhiambo, 2020; Ozcan et al., 2020; Saud et al., 2020; Wang and Dong, 2019). Before the industrialization process, CO_2 emissions in the world were much lower than what they are today (Kim and Park, 2020; Moerschbaecher and Day, 2010). Increasing fossil fuel consumption along with capital-intensive production techniques has increased the relative share of toxic gases in the air, such as CO_2 (Anwar et al., 2020; Saud et al., 2020; Tsou and Edelman, 2013; Waqih et al., 2019).

The industrial revolution produced significant quantitative and qualitative changes in production and accelerated the globalization process as well (Ateş, 2008; Sachs, 2017). Gurgul and Lach (2014) define globalization as the process of goods and capital market unification around the world, in which barriers to international trade and foreign investment are reduced. The removal of barriers between countries connects economies and results in various consequences in all areas of life (Ayomitunde et al., 2020; Radulović and Kostić, 2020; Shahbaz et al., 2015; Wang et al., 2019). One of the variables in globalization is environmental conditions (Baek et al., 2009; Shahbaz et al., 2015; Yang et al., 2019).

There are viewpoints that explain the impact of globalization on the environment in different ways. The first of these viewpoints is the pollution haven hypothesis (PHH). According to this hypothesis, producers who want to minimize their costs transfer their economic activities to countries with weak environmental standards, through foreign direct investment (FDI) (Candau and Dienesch, 2017; Dong et al., 2012; Shao, 2018; Zugravu-Soilita, 2017). PHH theory posits that polluting industries move from countries with strict environmental regulations to countries with weak regulations (Ayadi et al., 2019; Cole, 2004; Dinda, 2004; Guzel and Okumus, 2020; Mert and Caglar, 2020). However, the pollution halo hypothesis argues that FDI has a positive effect on the environment (Demena and Afesorgbor, 2020; Jun et al., 2018; Repkine and Min, 2020). The halo effect hypothesis states that foreign–funded companies spread knowledge and that domestic businesses implement environmentally friendly practices, while improving their environmental performance (Doytch and Uctum, 2016; Mabey and McNally, 1999; Mert and Caglar, 2020; Repkine and Min, 2020; Singhania and Saini, 2021).

Simultaneously, globalization alters the environmental balance through three channels, namely the scale effect, the composition effect, and the technique effect (Grossman and Krueger, 1991; Rafindadi and Usman, 2019; Rahman, 2020; Sethi et al., 2020; Shahbaz et al., 2015). According to the scale effect, economic activities and total production levels expand because of trade liberalization. The expansion of economic activities significantly increases the use of natural resources and causes environmental degradation (Aktaş, 2015; Etokakpan et al., 2020; McAusland, 2008; Saidi and Hammami, 2015; Shahbaz et al., 2016). The globalization process also creates changes in the mix of production and consumption activities (Copeland, 2009). The transition from the agricultural sector to the industrial sector may lead to higher energy consumption and CO_2 emissions, but the transition from the industrial sector to the service sector is expected to reduce emissions (Aller et al., 2015; Frankel, 2003; Grossman and Krueger, 1995; Zheng et al., 2015). The technical effect implies a reduction in pollution emissions due to increased demand for stricter environmental regulations because of economic growth (Honma, 2015; Saud et al., 2020; Shahbaz et al., 2016). Generally, it can be said that the scale effect has negative consequences on environmental conditions, but the technical effect can reduce this negative effect. The environmental consequences of the composition effect may vary (Tamiotti et al, 2009).

Integration into the global economic system has also significantly changed countries' income levels. The relationship between income and environmental degradation is explained within the framework of the Environmental Kuznets Curve (EKC) hypothesis (Ahmed and Long, 2012; Amar, 2021; Ozcan et al., 2020). This hypothesis states that environmental degradation increases in the early stages of economic growth but economic growth leads to environmental improvement, after reaching a certain per capita income level (Özmen et al., 2019; Rehman and Rashid, 2017). After reaching a certain income level, education levels rise and environmental awareness becomes stronger as the economy transitions from industrial based to service sector based (Dinda, 2004; Isik et al., 2019; Mazur et al., 2015; Panayotou, 1993).

The tourism sector is one of the indicators whose effects on the environment are disputed. In this study, the relationship between tourism and the environment is discussed in detail, both theoretically and empirically. This study contributes to other studies in the literature that examine the effects of globalization, income, and tourism on the environment. National and international tourism's contribution to air pollution was first discussed theoretically by Bach and Gößling (1996). They stated that the aviation industry increases greenhouse gas emissions, such as CO_2 (Folke et al., 2006; Koçak et al., 2020; Scott et al., 2012; Stefan, 2010). Following this research, interest in the relationship between tourism and CO_2 emissions increased. With the effects of globalization and economic growth, the number of tourists in the world is increasing day by day, so the environmental dimensions of tourism have become critical.

According to the (UNWTO and ITF, 2019), international tourist arrivals, which were 770 million in 2005, increased to 1.2 billion in 2016 and are estimated to be 1.8 billion in 2030. Domestic tourist arrivals are expected to reach 15.6 billion in 2030 from 4 billion in 2005. Since the transportation sector is one of the main elements in the tourism sector, this increase in tourism-related activities increases energy consumption and CO_2 emissions. Therefore, tourist arrivals and departures increase energy-related CO_2 emissions (Amin et al., 2020; Dogan and Aslan, 2017; Liu et al., 2019). International tourism revenues positively affect economic growth by increasing net exports (Aratuo et al., 2019; Brida et al., 2020; Eyuboglu and Uzar, 2020; Leitão and Lorente, 2020; Selvanathan et al., 2020). As economic growth stimulates consumption and investment expenditures, energy demand expands. All tourist activities are based on energy from fossil fuels that contribute to CO_2 emissions (Balli et al., 2019; Jebli et al., 2019; Mikayilov et al., 2018; Nepal et al., 2019; Zhang et al., 2019). Although the negative effects on the environment are emphasized here, tourism may also affect the environment positively, because economic growth caused by increasing tourism revenues improves living standards (Dayananda, 2016). Within the framework of these explanations, we will investigate whether globalization, income, and international tourism activities impact CO_2 emissions by analyzing data from the period between 1995 and 2014 in the 10 countries that attracted most tourists, through panel long-run FMOLS and DOLS and panel short-run PMG and MG coefficient estimation methods. Our study was guided by Akadiri et al. (2019c), Akadiri et al. (2019b) and Akadiri et al. (2020b) whose studies examined the causal link between CO_2 emissions, globalization, economic growth, and tourism. However, these studies are specific to the 10 top tourist destinations. The essence of this study, considering the top 10 countries, stems not only from the countries' strong tourism activities, but also from the countries' structural economic characteristics. Therefore, this study examines the short- and long-run relationship between variables (CO_2 emissions as a measure of pollutant emissions, real income, globalization, and tourism) observed in the top 10 tourist-attracting countries. This study adds novelty to the literature, potentially presenting a unique difference from previous studies. Given the uniqueness of the sample economies, this is the first study to support the 'myth' of short- and long-term. Because it had previously been unclear if there was a significant difference between the two periods in the economies of the top 10 countries. Also, to the knowledge of the authors, this is the first study to examine the environmental impact of globalization on the top 10 countries.

The rest of this paper is structured as follows. Section 2 focuses on the literature review. Section 3 describes the model, methodology, and data. Section 4 reports and discusses the empirical findings and finaly, Section 5 concludes with some policy implications.

2. Literature Review

In the literature, there are a number of studies addressing the impact of globalization, income, and tourism on the environment. However, there are only a limited number of studies that examine the relationship between these four variables together. To begin with, we examine studies on the relationship between globalization and the environment, income and the environment, and tourism and the environment separately. Then, we briefly present the information about the studies we could access that cover these four variables.

Though there are many studies test the relationship between income and environment, most recent studies emphasize causality. While the samples and analysis periods in these studies were different, results indicate that the direction of causation between the two variables was also different. Magazzino (2016) examined the period between 1960 and 2013 in Gulf Cooperation Countries (GCC). According to the causality test findings, income causes environmental pollution in Qatar, Oman, and Kuwait. Ahmad et al. (2019)'s results from a sample of Chinese provinces show that increases in income, increase environmental pollution. The results of Khan et al. (2020) show that economic growth increases the CO_2 emissions for the period between 1965 and 2015 in Pakistan. In contrast, Gokmenoglu and Sadeghieh (2019) found that income increases have a positive effect on the environment in the period between 1960 and 2011 in Turkey. Chen et al. (2019) conclude, with the data from 1980 to 2014, according to causality test findings, there is a bidirectional causality between income and environment in China. Likewise, Acheampong (2018) finds bidirectional causality between income and environment in Caribbean-Latin America areas. Banday and Aneja (2019) indicate causality from income to environmental pollution in 4 G7 countries, and from environmental pollution to income in a single country. Gövdeli (2019) identifies causality from income to environmental pollution in 26 OECD countries and Stamatiou and Dritsakis (2019) determine unidirectional causality from income to environmental pollution in Italy. The tests performed by Zaidi and Ferhi (2019) show a bidirectional linear association between income and the environment in sub–Saharan countries. Adedoyin et al. (2020) demonstrate that in the case of BRICS countries, there is a positive interaction between income and the environment. However, there are studies in which causality could not be determined. In this context, Cai et al. (2018), Gorus and Aydin (2019), and Salahuddin and Gow (2014) indicate that there is no causal relationship between income and the environment.

Socio-cultural needs, brought about by increases in income, accelerate tourism activities worldwide. Tourism revenues are an important part of economic growth in many countries. In this context, the direction of the link between tourism and environmental balance has begun to be widely considered in empirical studies. While Lee and Brahmasrene (2013) conclude that tourism in the European Union reduces environmental pollution, Alam and Paramati (2017), Anser et al. (2020) and Sharif et al. (2020b) find that tourism is the cause of environmental pollution in some selected countries. Dogan and Aslan (2017) evidence unidirectional causality from tourism to environmental pollution in the European Union and candidate countries. Whereas, Paramati et al. (2017b) show that in countries located in the western part of the European Union, tourism reduces environmental pollution, and increases it in countries located in the eastern part. However, Paramati et al. (2017a) in another study, find bidirectional causality in developed countries but did not find causal relationships between tourism and the environment in developing countries. Likewise, Satrovic and Muslija (2019) also did not find causality between tourism and the environment in the period between 1995 and 2016 in the 10 countries that attracted the most tourists in 2016. Eyuboglu and Uzar (2020) find bidirectional causality between tourism and the environment in the long run for the period betwenn 1960 and 2014 in Turkey. The analysis results from Koçak et al. (2020) indicate a bidirectional causal relationship between tourism and environmental pollution in the most visited countries. Finally, in Fethi and Senyucel (2020)'s study, where the authors investigate the role of tourism's development in reducing CO_2 emissions in the top 50 countries that attracted the most tourists, the empirical findings show that the effects of tourism on emission levels are significant and negative, mainly in the cases of France, USA, UK, Germany, Spain, and China, whereas tourism development is positively significant in the cases of Turkey, Thailand, Russia, Greece, Saudi Arabia, Macao, Indonesia, Brazil, Dominica, Philippines, Bulgaria, Tunisia, Egypt, Iran, Georgia, Hong Kong, India, and Malaysia. Jebli et al. (2019), indicate that tourism (particularly green tourism) is a good policy for some countries to combat climate change.

Globalization gained momentum in the Industrial Revolution, and has become a multi-dimensional process today. Whether or not this process is associated with problems in environmental quality has been one of the key areas for discussion. Kalayci and Hayaloğlu (2019) found a positive relationship between globalization and environmental pollution in NAFTA countries. The results from Zaidi et al. (2019) on Asia Pacific Economic Cooperation (APEC) countries, point to globalization as the cause of environmental pollution. Likewise, Khan et al. (2019), Khan and Ullah (2019), and Shahbaz et al. (2019) report that globalization increases environmental pollution. The results from Liu et al. (2020) show the validity of an inverted-U relationship, similar to the Environmental Kuznets Curve, between globalization and environmental pollution in G7 countries. Ulucak and Khan (2020), with the data from 1990 to 2015, indicate that globalization has a positive effect on environmental pollution in BRICS countries. However, Saint Akadiri et al. (2019a), Haseeb et al. (2018), Lv and Xu (2018), Shahbaz et al. (2017), and Zafar et al. (2019) find that there is an inverse relationship between the environment and globalization. The results from Saint Akadiri et al. (2020a) show that there is one-way causality from globalization to CO_2 emissions, but according to the generalized impulse response function, CO_2 emissions do not react to changes in globalization.

Multivariate analyses focus on developed countries, Asian countries, the countries that attract the most tourists, emerging economies, and specific groups in terms of the sample (e.g. Brahmasrene & Lee, 2017; Saint Akadiri et al., 2019c; Gerceker et al., 2019; Saint Akadiri et al., 2020b). Brahmasrene and Lee (2017) explore the relationship between globalization, income, tourism, urbanization, industrialization, and environmental using a panel cointegration test. Their results show that these variables act together, eventually. Saint Akadiri et al. (2019c) analyze the relationship between globalization, income, tourism, energy consumption, and the environment for the 15 countries that attract the most tourists. Their findings show that energy consumption, globalization, and real income increase environmental pollution, while tourism and the square of real income reduce environmental pollution. These results indicate that the Environmental Kuznets Curve hypothesis is valid. Gerceker et al. (2019) investigate the relationship between globalization, income, tourism, and environment in 16 Mediterranean countries. Their results imply that real income and tourism have a statistically significant effect on the environment. Additionally, increases in real income and tourism have a negative impact on the environment. Saint Akadiri et al. (2020b) investigate the causality between tourism, globalization, economic growth, and CO_2 emissions in 16 small island countries. Their results imply that there is a link from international tourism and economic growth to CO_2 emissions across the panel. However, there is also causality from CO_2 emissions to international tourism.

Saint Akadiri et al. (2019b) and Uzuner et al. (2020) provide an example of time series studies. The sample in both studies is Turkey, but the methods differ. Saint Akadiri et al. (2019b)'s results show that globalization has non-significant negative impacts on CO_2 emissions, while increases in real income levels and international tourists' arrivals cause CO_2 emissions to rise both in the short run and the long run. The causality analysis notes that tourism Granger-causes CO_2 emissions both in the short and long run, while real income and globalization only Granger-cause CO_2 emissions, eventually. Uzuner et al. (2020) only examine causality and their findings show that both the positive and negative shock of tourism influence CO_2 emissions in the long run, while in the short run, only the negative shock of tourism contributes to CO_2 emissions. They also found bidirectional causality between globalization and CO_2 and between economic growth and CO_2.

To investigate the causality between variables in developed countries, Balsalobre-Lorente et al. (2020) focused on OECD countries. According to panel causality test findings, there is a bidirectional causality between globalization, energy, and environmental pollution, and one-way causality from income and tourism to environmental pollution.

3. Data and Measurements

The variables in our study are CO_2 emissions in metric ton per capita, real GDP in US dollars (2010 = 100) (Rgdp), and the tourism variable as the total number of international tourists arriving (Ta). This study was performed according to suggestions in Saint Akadiri et al. (2019b), Akadiri et al. (2020b), Gunduz and Hatemi-J (2005), Katircioglu (2009; 2010; 2014a; 2014b), and Ozcan et al. (2017). The Konjunktur For Schungsstelle (KOF) index from the Swiss Economic Institute developed by Dreher (2006) was used as the globalization measurement unit.

Table 1. Data Description

Variables	Code	Unit	Source	Period
Carbon dioxide	$lnCO_2$	Metric ton per capita	WDI	1995–2014
Economic growth	lnRgdp	Constant (2010 US $)	WDI	1995–2014
International tourism	lnTa	Number of arrivals	WDI	1995–2014
Globalization	lnCof	KOF Index (0–100)	Swiss Economic Institute	1995–2014

The selection of the sample is based on the countries (China, France, Germany, Italy, Mexico, Spain, Thailand, Turkey, the United Kingdom, and the United States) that attract the largest number of tourists (UNWTO, 2019). However, the sample selection is limited by the accessibility of the data. Because of this, it is easier to obtain the possible effects of tourism on the environment in these countries. By choosing variables in this way, we could consider the tourist data from countries, and income and globalization relationships in the context of CO_2 emissions.

In the literature, there are several models to estimate the relationships between these variables. Our study is based on the model (Equation 1) proposed by Saint Akadiri et al. (2019b) for time series and by Gerçeker et al. (2019) for panel data.

$$lnCo_{2_{i,t}}=\alpha_0+\beta_1 lnRgdp_{i,t}+\beta_2 lnTa_{i,t}+\beta_3 lncof_{i,t}+\varepsilon_{i,t} \qquad (1)$$

Where at cross-section *i* and period *t*, $lnCO_2$ is the natural log of CO_2 emissions, *lnRgdp* is the natural log of real income, *lnTa* is the natural log of tourists arriving, *lnCof* is the natural log of the total globalization index, and ε is the error term.

4. Estimation Methodology

In this study, we use panel unit root tests, panel cointegration tests, and panel cointegration estimators to investigate the effects of globalization, real income, and tourism variables on the environment.

4.1. Panel Unit Root test

Panel unit root tests are divided into two categories according to whether they consider cross-section dependency in groups that form the panel dataset of the test statistics. The tests called first-generation unit root do not consider cross-section dependence, whereas the distinctive feature of the second-generation panel unit root tests is that the test statistics are developed taking into account cross-section dependency (Hurlin and Mignon, 2007).

Many studies depend on panel unit root tests to increase the statistical power of their empirical findings. In this respect, many panel unit root tests are preferred, but we employ unit root tests that complement each other. For instance, LLC is based on the assumption of long-term equilibrium in cross-sections, while IPS assumes that cross-sections are heterogeneous. Additionally, ADF type tests are nonparametric unit root tests. These features were the reason we chose these tests. In this study, the preferred unit root tests, valid for heterogeneous panel samples, are Im, Pesaran and Shin (IPS) (Im et al., 2003), Augmented Dickey-Fuller (ADF), and Phillips-Peron (PP) tests. Levin, Lin and Chu (LLC) (Levin et al., 2002) unit root test is one of the first-generation unit root tests applied to homogeneous panels.

The basic assumptions of the Levin et al. (2002) test are that fixed effects change according to the country, the autocorrelation coefficient is homogeneous for all cross–sections in the panel dataset, and there is no dependency between cross-sections. The LLC test assumes that the autocorrelation coefficient is homogeneous for all cross sections in the panel dataset. Im et al. (2003) developed a test that allowed the autocorrelation coefficient to change, that is, to be heterogeneous, for each unit in the panel. Maddala and Wu (1999) and Choi (2001) proposed a Fisher type test as an alternative, based on combining unit root test statistics for each nonparametric cross-section. For Fisher type test equations, exogenous variables can be determined. External variables cannot be used in test equations, but individual constants (constant effects) or individual constants and trends can be used. Choi (2001) tests the ADF and PP unit root tests, with the null hypothesis and alternative hypothesis with the same hypotheses in the IPS test. Maddala and Wu (1999) are used to determine the number of lags used in ADF regression for each cross-section in the unit root test, while in the Choi (2001) test, Kernel calculation is used as the method for correcting the autocorrelation.

4.2. Panel Cointegration Test

In panel data analyses for testing the long-run cointegration relationship between dependent and independent variables, the panel cointegration tests proposed by Pedroni (1999) are widely used in empirical analyses. In this approach, it is assumed that the dependent and independent variables are not stationary at their levels; therefore, they are stationary in the first difference.
The coefficients of the independent variables in the model of ordinary least square proposed by Pedroni (1999) are variable for each cross-section in the panel. Therefore, the cointegrating vector is heterogeneous for each unit forming the panel. The null hypothesis of this test is "H_0: There is no cointegration relationship for all cross sections."

Pedroni's technique is useful for our study because Pedroni (1999) panel cointegration tests are used to investigate whether the variables are cointegrated in the panel under investigation, given the existence of heterogeneity. This method allows coherent and effective prediction of cointegration vectors and addresses the problem of non-stationary regressors, as well as the problem of simultaneity biases. The statistics from the Pedroni (1999) test give results on seven different cointegration relations. Four of these are known as within-dimension (Panel-V, Panel-RHO, Panel-PP, and Panel-ADF) and three as between-dimension (Group-RHO, Group-PP, and Group-ADF) panel cointegration tests. Between-dimension tests are valid for heterogeneous panels and within-dimension tests are valid for homogeneous panels.

4.3. Panel Cointegration Estimators

We use econometric methods to estimate the in Equation 1 with several coefficient estimators to investigate the theoretical relationships stated in the introduction section. For this purpose, we chose methods that consider heterogeneity with the premise that the slope coefficients are heterogeneous in the long-run coefficient estimates for each panel member.

In this study, we use four different estimators, in two groups. Some of those in the first group are panel Dynamic Ordinary Last Square (DOLS) and Full Modified Ordinary Last Square (FMOLS) predictors developed by Pedroni (2001a, 2001b). These methods estimate the cointegrating vector with dimension data based group mean estimators for each unit and allow the cointegration coefficients to be heterogeneous between the cross-sections. Also, with these methods, panel coefficients can be interpreted as the average of the long run co-integrating vector (Pedroni, 2001b).

The first of the estimators in the second group is the Mean Group (MG), a heterogeneous estimator developed by Peseran and Smith (1995) for the Panel Autoregressive Distributed Lag (ARDL) model (Blackburne III and Frank, 2007; Pesaran and Smith, 1995). This method considers the heterogeneity of the parameters (Özmen et al., 2019). The main inadequacy of the MG estimator is that it does not allow certain parameters to be equal among the units that make up the panel. This inadequacy in the MG estimator was rectified by the Panel Mean Group (PMG) estimator developed by Pesaran et al. (1999), the second estimator that we have included in this group. With this method, panel long-run or group short-run relationships can be observed. Moreover, the PMG estimator is an approach that accepts that the parameters are (N) heterogeneous between countries in the short and long run.

Panel DOLS and FMOLS estimators are used to solve the problems of internality between the independent variable(s) and error term, as well as auto-correlation in error terms. In addition to this, they are more efficient than the panel OLS. FMOLS and DOLS estimators allow for heterogeneity across individuals and these include individual-specific time trends, individual-specific fixed effects, and time-specific effects. The estimator is entirely parametric and more precise than the single equation estimators. We also applied MG and PMG for robustness.

5. Empirical Results

In this study, we investigate the impact of globalization, income, and tourism on the environment in the 10 countries that attracted the most tourists in 2019 using panel data techniques. The test and the findings are discussed as follows:

5.1. Results of Unit Root Test

Preliminary tests are important for the consistency and accuracy of the model. Descriptive statistics for the variables included in Equation 1 are presented in Table 2.

Table 2. Descriptive Statistics

	lnCO_2	**lnRgdp**	**lnTa**	**lnCof**
Mean	1.838	28.222	17.246	4.298
Median	1.811	28.361	17.264	4.360
Maximum	3.004	30.418	18.242	4.491
Minimum	0.974	26.018	15.746	3.793
Sad. Dev.	0.524	1.035	0.612	0.156
Skewness	0.471	0.067	−0.462	−0.850
Kurtosis	2.679	2.952	2.610	3.011
Jarque–Bera	8.251	0.171	8.398	24.123
Probality	0.016	0.917	0.015	0.0e6
Observations	200	200	200	200

When the results of descriptive statistics are evaluated in terms of distortions, the lnTa and lnCof variables are skewed to the left, lnCO_2 and lnRgdp are skewed to the right. Additionally, lnRgdp is the variable with the highest volatility among the variables. The lnCO_2 and lnCof averages are low compared to lnRgdp and lnTa.

Separate regression results for InCO_2 and each dependent variable are displayed graphically in Figure 1. In presenting these results this way, it is possible to show that in the literature, these variables were included in the analyses in separate models. These plots regress each variable against all others, and notice the coefficients on each. According to these results, all data points seem to be in range, with no outliers observed.

Table 3 shows a correlation matrix for all variables in the model. Pearson correlation coefficients range from -1 to 1. The closer the value is to 1, the stronger the correlation. The results are presented in this table with the graphic of the correlation matrix (Figure 3). These findings also support the results in Figure 2. The lnRgdp and lnCof correlation matrix coefficients are relatively higher than lnTa.

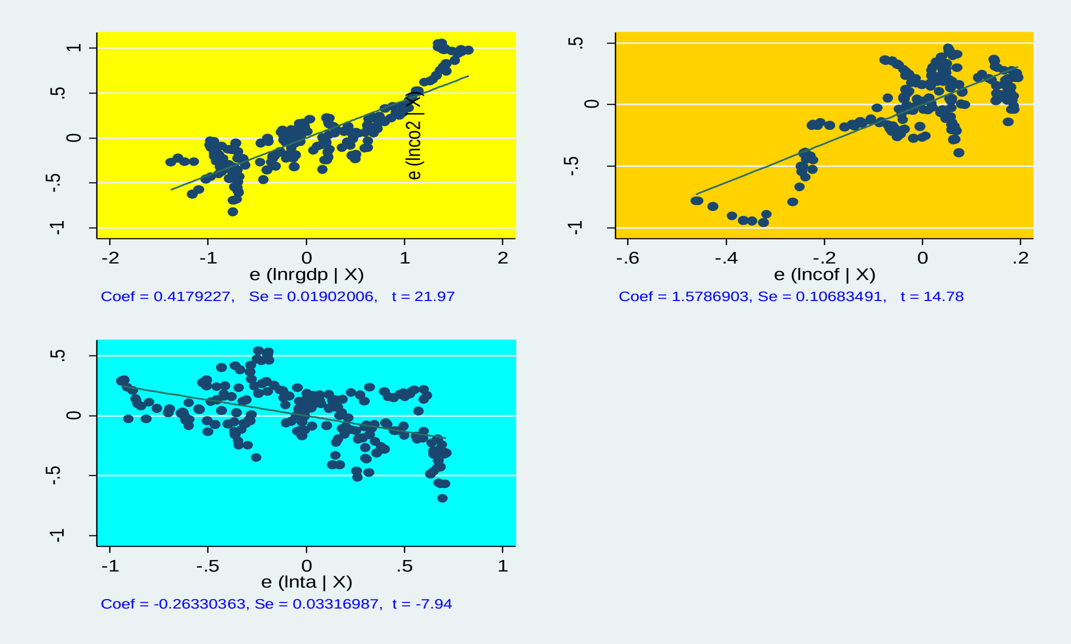

Figure 1. Graphical representation of the regression ($lnCO_2$; lnRgdp, lnCof, lnTa)

Table 3. Results of Correlation Matrix

	$lnCO_2$	lnRgdp	lnTa	lnCof
$lnCO_2$	1.000	---	---	---
lnRgdp	0.8188 [0.000]	1.000	---	---
lnTa	0.4643 [0.000]	0.6642 [0.000]	1.000	---
lnCof	0.6719 [0.000]	0.4200 [0.000]	0.4746 [0.000]	1.000

Notes: The probability selected as 5%. [] indicates the probability values.

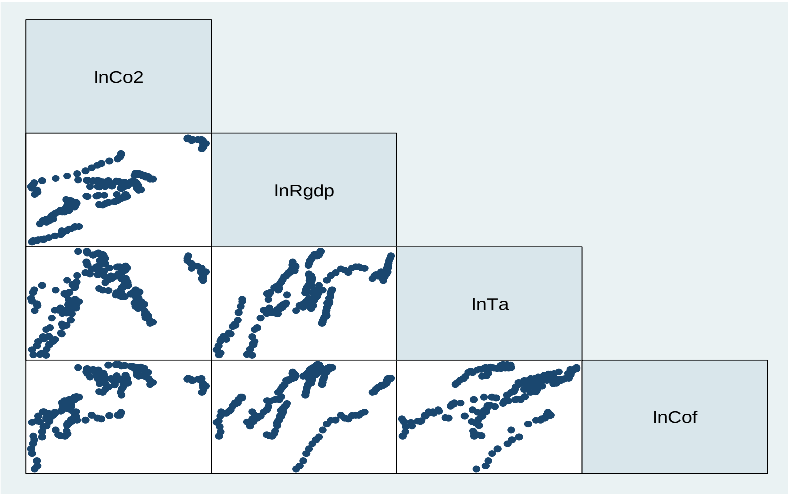

Figure 2. Graphical representation of the correlation matrix

Table 4. Results of Unit Root Tests

		Level				First Difference			
		Intercept		Intercept and Trend		Intercept		Intercept and Trend	
		Stat.	prob.	Stat.	prob.	Stat.	prob.	Stat.	prob.
lnCO₂	LLC	1.528	0.936	−0.691	0.244	−7.605	0.000[a]	−6.101	0.000[a]
	IPS	5.071	1.000	4.473	1.000	−7.450	0.000[a]	−7.488	0.000[a]
	ADF	7.695	0.993	23.102	0.283	93.687	0.000[a]	87.246	0.000[a]
	PP	6.188	0.998	15.606	0.740	118.670	0.000[a]	121.789	0.000[a]
lnRgdp	LLC	−2.276	0.011[b]	−0.674	0.250	−5.687	0.000[a]	−5.827	0.000[a]
	IPS	−0.277	0.390	0.875	0.809	−4.649	0.000[a]	−4.352	0.000[a]
	ADF	26.485	0.150	20.394	0.433	57.558	0.000[a]	53.809	0.000[a]
	PP	33.128	0.032[c]	13.003	0.877	69.495	0.000[a]	75.686	0.000[a]
lnTa	LLC	−0.290	0.385	−2.235	0.017[b]	−7.159	0.000[a]	−5.141	0.000[a]
	IPS	2.551	0.994	−1.788	0.036	−7.466	0.000[a]	−6.016	0.000[a]
	ADF	14.135	0.823	34.146	0.025[b]	88.361	0.000[a]	67.875	0.000[a]
	PP	15.885	0.723	14.053	0.827	94.042	0.000[a]	79.046	0.000[a]
lnCof	LLC	−8.905	0.000[a]	−1.594	0.055[c]	−8.443	0.000[a]	−8.387	0.000[a]
	IPS	−4.4119	0.000[a]	−0.269	0.393	−6.046	0.000[a]	−6.872	0.000[a]
	ADF	54.538	0.000[a]	24.596	0.217	71.737	0.000[a]	76.879	0.000[a]
	PP	78.083	0.000[a]	22.921	0.292	66.110	0.000[a]	69.448	0.000[a]

Notes: While calculating the long-run consistent error variance in the LLC test, the Barlett method was used as the Kernel estimator, and the bandwidth was selected according to the NeweyWest method.
In the LLC, IPS, ADF, and IPS tests, the maximum lag length was as 3, and the optimal lag length was determined according to the SCI information criterion. a, b, and c show that 1%, 5%, and 10% are statistically significance levels.

According to the unit root test results in Table 4, lnCof is stationary I(0) at level, while it contains unit root at the level according to fixed and trending results, and becomes stationary in the first difference I(1). However, all variables (InCO_2, InRgdp, and InTa) in stationary, trend stationary are I(1) stationary in the first difference.

5.2. Results of Panel Cointegration Test

When it is accepted, considering the trend stationary values of series, that series are I(1) stationary in the first differences, it is important to determine whether they move together in the long run, that is, whether they are co–integrated. The tests developed by Pedroni (1999) to understand this, offer a suitable form for either homogeneous or heterogeneous panel structures. The findings of these cointegration tests are shown in Table 5.

According to Group-PP and Group-ADF that are valid for heterogeneous panels, the series act together eventually for the top 10 tourist destination countries. According to the heterogeneous cointegration test results, CO_2 emissions, economic growth, international tourism, and globalization act together in the long term, and these results are based on strong findings.

Table 5. Results of Cointegration Tests

Within-dimension test	Constant		Constant and Trend	
	Stat.	prob.	Stat.	prob.
Panel-V	−0.749	0.773	3.800	0.000[a]
Panel-RHO	1.941	0.973	1.487	0.931
Panel-PP (non-parametric)	1.793	0.963	−1.520	0.064[c]
Panel-ADF (parametric)	1.877	0.969	−3.101	0.001[a]
Between-dimension test	**Constant**		**Constant and Trend**	
	Stat.	**prob.**	**Stat.**	**prob.**
Group-RHO	2.221	0.986	2.018	0.978
Group-PP (non-parametric)	0.840	0.799	−5.663	0.000[a]
Group-ADF (parametric)	0.740	0.770	−4.463	0.000[a]

Notes: In Pedroni tests, the maximum lag length as 1, and the optimal lag length is determined according to the SCI information criterion. Bartlett kernel and Newey-West automatic bandwidth selection were used for non-parametric (PP-type) tests. a, b, and c show that 1%, 5%, and 10% are statistically significance levels.

5.3. Results of Panel Cointegration Estimators

The findings from the FMOLS and DOLS estimators, which we use to estimate the long-run coefficients based on the unit root test results of series stationary in the first difference, are shown in Table 6.

Table 6. Results of FMOLS and DOLS

Country	FMOLS			DOLS		
	lnRgdp	lnTa	lnCof	lnRgdp	lnTa	lnCof
China	4.83 [0.000][a]	0.52 [0.258]	−1.65 [0.142]	1.84 [0.000][a]	−2.38 [0.002][a]	1.80 [0.052][c]
France	1.55 [0.095][c]	0.94 [0.157]	−9.66 [0.013][b]	2.44 [0.030][b]	1.81 [0.127]	−14.22 [0.024][b]
Germany	0.75 [0.062][c]	−0.32 [0.001][a]	−0.86 [0.004][c]	3.77 [0.101]	−1.06 [0.074][c]	−2.93 [0.108]
Italy	1.68 [0.000][a]	−1.36 [0.000][a]	1.07 [0.470]	−0.37 [0.287]	−3.24 [0.000][a]	9.32 [0.001][a]
Mexico	0.34 [0.363]	−0.50 [0.005][a]	0.33 [0.617]	1.58 [0.045][b]	−0.822 [0.124]	−1.37 [0.227]
Spain	1.18 [0.055][c]	1.06 [0.079][c]	−8.61 [0.006][a]	0.95 [0.039][b]	−0.65 [0.225]	0.43 [0.834]
Thailand	0.80 [0.000][a]	−0.04 [0.580]	0.11 [0.773]	0.95 [0.000][a]	0.16 [0.060][c]	−1.58 [0.007][a]
Turkey	0.37 [0.025][b]	0.01 [0.953]	0.46 [0.384]	−0.09 [0.637]	0.33 [0.033][b]	−0.60 [0.636]
UK	2.45 [0.077][c]	−1.09 [0.011][b]	−10.34 [0.054][c]	6.27 [0.000][a]	−2.28 [0.000][a]	−21.85 [0.000][a]
United States	−0.36 [0.214]	−0.42 [0.000][c]	1.79 [0.215]	−1.10 [0.019][b]	−0.59 [0.001][a]	6.66 [0.035][b]
Panel	0.89 [0.000][a]	−0.15 [0.052][c]	−0.92 [0.076][c]	1.13 [0.000][b]	−0.09 [0.183]	−1.59 [0.014][b]

Notes: Bartlett kernel and "Newey–West automatic" bandwidth method were used for FMOLS. In the DOLS estimator, the maximum lag length number is 1 and the optimal lengths are determining according to the SCI information criterion. [] symbolizes probability values. UK: United Kingdom. a, b, and c show that 1%, 5%, and 10% are statistically significance levels.

According to the FMOLS coefficient estimation results for each country in Table 6, throughout the panel, the lnRgdp variable has positive effects on $lnCO_2$ emissions whereas the InTa and InCof variables stand out with their negative effects on $lnCO_2$ emissions. In this context, the lnRgdp variable has a positive sign in all countries except Mexico and the United States, while the lnTa variable is negatively marked in Germany, Italy, Mexico, the UK, and the United States. However, in Spain, the InTa variable has a positive effect on CO_2 emissions. Finally, the lnCof variable has a negative effect in France, Germany, Spain, and the UK.

In the DOLS coefficient estimation results for each country, the lnRgdp variable is positively marked in China, France, Mexico, Spain, Thailand, and the UK. However, lnTA has a negative effect on lnCo2 emissions in China, Germany, Italy, the UK, and the United States. InCof is positively marked in China, Italy, and the United States, and negatively marked in France, Thailand, and the UK. It is also worth noting that the coefficients of the lnCof variable are relatively high.

According to the findings of the stationary model, within the scope of unit root test results, lnCof is stationary I(0) at level, while the trend stationary unit root findings showed that the series did not contain unit root in the first difference of the series. Therefore, when making short-run coefficient estimates, PMG and MG estimators can provide efficient results with the condition that the dependent variable ($lnCO_2$) is stationary in the first difference and in cases where independent variables are stationary at different levels I(0), I(1) or I(2). Information on which of these tests is more efficient is based on the findings from the Hausman test.

Short-run PMG and MG estimators based on Panel ARDL belonging to each country and the Hausman test findings are shown in Table 7.

In the Hausman test results in Table 7, the null hypothesis of "H_0: The difference between MG and PMG estimates is significant" and PMG is more efficient cannot be rejected. Therefore, we can assume that PMG results are more efficient at this stage.

According to the short-run PMG coefficient estimation results for each country shown in Table 6, lnRgdp (as in FMOLS and DOLS results) stands out with its positive effects. In the PMG results, lnRgdp coefficients for all countries, except China, are statistically significant and positively marked. The coefficient results of lnTa are positive in Spain whereas, in Mexico negatively marked. lnCof's country estimate coefficient is statistically significant and negative only in Italy.[1]

Finally, when the FMOLS and DOLS panel general coefficient estimation results shown in Table 6 and Table 7 are compared with PMG panel coefficient estimation results, all estimators appear to have similar results regarding the signs of the coefficient estimates for the lnRgdp (positive) and lnCof (negative) variables. On the other hand, while the overall coefficient estimation results of lnTa are not statistically significant according to the PMG and DOLS estimators, according to the FMOLS estimator, it is statistically significant and negative.

Especially, when short-run PMG and long-run FMOLS and DOLS results are evaluated together, it can be determined that the EKC hypothesis is valid only in the UK. It can be determined that the results of the lnRgdp coefficient, which was positive in the short run (PMG) in the UK, turned negative in the long run (DOLS). While in Mexico and Spain, the coefficient of lnTa was negative and statistically significant in the short (PMG) and long run (FMOLS). Additionally, the short-run (PMG) and long-run

(FMOLS) results of the lnCof variable in Italy are negative and statistically significant. The findings are summarized in Table 8 for the panel group effects.

Table 7. Results of MG and PMG Short-Run (ARDL 1,1,1)

Country	MG			PMG		
	lnRgdp	**lnTa**	**lnCof**	**lnRgdp**	**lnTa**	**lnCof**
China	1.78 [0.094][c]	0.17 [0.391]	−1.37 [0.219]	0.76 [0.267]	−0.04 [0.697]	−0.26 [0.646]
France	1.07 [0.318]	−0.40 [0.406]	−2.41 [0.324]	1.40 [0.055][c]	−0.52 [0.146]	−1.37 [0.378]
Germany	0.67 [0.252]	0.19 [0.555]	−2.49 [0.118]	0.75 [0.030][c]	0.18 [0.353]	−1.77 [0.128]
Italy	1.76 [0.000][a]	−0.01 [0.889]	−0.90 [0.212]	1.82 [0.000][a]	−0.04 [0.624]	−0.97 [0.030][b]
Mexico	0.43 [0.152]	−0.14 [0.405]	0.14 [0.855]	0.44 [0.026][b]	−0.18 [0.056][c]	0.22 [0.668]
Spain	1.21 [0.059][c]	0.54 [0.076][c]	−0.11 [0.942]	1.19 [0.002][a]	0.55 [0.002][a]	0.20 [0.859]
Thailand	1.08 [0.000][a]	−0.19 [0.122]	−0.06 [0.934]	1.09 [0.000][a]	−0.13 [0.139]	−0.26 [0.650]
Turkey	0.86 [0.002][a]	0.07 [0.935]	0.05 [0.932]	0.79 [0.000][a]	0.01 [0.795]	0.05 [0.897]
UK	0.76 [0.415]	−0.07 [0.756]	−1.88 [0.611]	1.12 [0.062][c]	−0.10 [0.602]	−0.46 [0.838]
United States	1.07 [0.016][b]	0.05 [0.574]	−0.19 [0.828]	1.07 [0.000][a]	0.06 [0.323]	−0.23 [0.723]
Panel	1.07 [0.000][a]	0.01 [0.868]	−0.92 [0.005][a]	1.04 [0.000][a]	−0.02 [0.797]	−0.48 [0.023][b]
				The Hausman test		
	Test stat.			2.80 [0.247]		

Notes: [] symbolizes probability values. UK: United Kingdom. a, b, and c show that 1%, 5%, and 10% are statistically significance levels.

Table 8. Summary of the Estimator Findings

Long run	**lnRgdp**	**lnTa**	**lnCof**
FMOLS	+	−	−
DOLS	+	−	−
Short Run			
PMG	+	−	−

6. Discussion and Conclusion

This study tests the impact of globalization, real income, and tourism on the environment in 10 countries that draw the most tourists, using data from the 1995 to 2014 period with panel data techniques. The stability feature was tested with LLC, IPS, ADF, and PP unit root tests and it was found to be stationary in the first differences of the series. Upon this, the tests developed by Pedroni (1999) were used to determine whether the series act together in the long run. Panel cointegration findings showed that variables act together eventually. In line with the cointegration findings, FMOLS and DOLS techniques for long-run coefficient estimates and PMG and MG results for short-run coefficient estimates are reported.

Our three cointegration estimator results provide the same results both in the long run and in the short run. The income variable has a positive effect on CO_2 emissions in the model. This result has a similar finding to Khan et al. (2020) and Adedoyin et al. (2020), while it has a contrasting finding with Gokmenoglu and Sadeghieh (2019). Similar results from these three studies also show the difficulty of environmentally conscious policies in developing countries.

While Lee and Brahmasrene (2013) conclude that tourism reduces environmental pollution, Alam and Paramati (2017), Anser et al. (2020), Sharif et al. (2020b), Jebli et al. (2019), Balsalobre-Lorente et al. (2020), Adedoyina et al. (2020), and Balsalobre-Lorente et al. (2021) find that tourism is the cause of environmental pollution in their sample. The results of this study imply that the tourism variable negativelly affects the environment. Fethi and Senyucel (2020), Gerçeker et al. (2019), Lee and Brahmasrene (2013), Paramati et al. (2017b), Saint Akadiri et al. (2019c), and Paramati et al. (2017b) have similar findings. Therefore, it emphasizes that tourism is a green sector.

We see from the literature that the effects of growth and tourism on environmental pollution are relatively less controversial than the effects of globalization. The effect of the globalization variable on the model was found to be negative. Khan and Ullah (2019), Khan et al. (2019), Shahbaz et al. (2019), and Ulucak and Khan (2020) also found a negative effect. In contrast, Kalayci and Hayaloğlu (2019) found a positive relationship. In this respect, discussions about whether globalization is positive or negative will continue for a long time. The difference in the findings may be due to sampling and methods. Additionally, the integration of countries into the global economy at different levels may be one of the main factors underlying this. We have also seen that tourism reduces environmental degradation in the sample countries (top 10 countries) in the short and long term. Additionally, the increase in globalization has a negative effect on environmental degradation. These results for tourism countries show that by reducing CO_2 emissions, environmental policies are compatible with macroeconomic targets as an effective tool in the fight against global warming. These findings are consistent with Saint Akadiri et al. (2019c) and it is in line with the points emphasized by Brahmasrene and Lee (2017) and Katircioglu (2014, 2014a). In summary, our findings confirm the importance of regulating environmental protection policies, as well as international tourism policies in tourism countries.

According to FMOLS coefficient estimation results, throughout the panel, the increase in real income increases CO_2 emissions, and tourism and globalization decrease CO_2 emissions. In this context, real income negatively affects the environment in all countries except Mexico and the United States. Tourism has a negative impact on the environment in Germany, Italy, Mexico, UK, and the United States. Therefore, these countries should continue their environmental policies to attract more tourists. However, since tourism increases CO_2 emissions in Spain, precautions should be taken to reduce environmental problems in this country. Finally, globalization has a positive effect on the environment in France, Germany, Spain, and the UK. According to the DOLS coefficient estimation results, increases in real income increase environmental pollution in China, France, Mexico, Spain, Thailand, and the UK. Tourism lowers CO_2 emissions in China, Germany, Italy, the UK, and the United States. Globalization increases CO_2 emissions in China, Italy, and the United States while decreasing it in France, Thailand, and the UK.

To determine the short-run effects of globalization, income, and tourism variables, PMG and MG estimators were calculated. However, the Hausman test showed that the PMG estimator was more reliable in determining short-run coefficients. Panel, the signs of the coefficients calculated using the PMG estimator are similar to the long-run results. Thus, while the income variable increases CO_2 emissions in the short-run, the globalization variable decreases CO_2 emissions. These results reveal that the variables of income and globalization have a statistically significant effect on the environment both in the short run and in the long run. However, the direction of causality between each variable and CO_2 emissions is different. As the increase in income stimulates production and consumption activities, it increases the emissions levels. This means these countries should use the increased income also to create a cleaner environment. In the PMG results, real income increases CO_2 emissions in all countries, except China. However, while tourism increases CO_2 emissions in Spain, it decreases them in Mexico. The globalization variable reduces CO_2 emissions only in Italy. Therefore, it is important to use and spread clean technologies to ensure consumption mobility activities and production factors, which increase due to globalization, do not harm environmental balances.

It should not be forgotten that selectivity draws the boundaries of environmental policies in countries. An example of this is the domestic economic dynamics in different countries. Unfavorable economic conditions can tie the hands of policymakers and can hinder sustainable environmental policies. Today, where economic and cultural integration is so intense, regional solutions are limited. However, we can suggest the following policies based on the findings from this study:

- Informative activities should be intensified through written and visual resources to increase environmental awareness in all economic elements.
- The use of renewable energy resources should be increased.
- Clean production techniques should be developed and expanded with some of the income generated from economic growth.
- Natural resources should be used effectively and efficiently.
- In order to generate more income from tourism, efforts to reduce air, water, and soil pollution should be intensified.

There are two main limitations to this study. The first is the sample (i.e. top ten tourist countries) and the second is based on first-generation panel data methods. Additionally, these models can be tested with different econometric methods (e.g. taking into account cross-sectional dependence and structural breaks). We focus only on some econometric methods and variables. For future studies, the variables used in the model can be tested with panel structural break econometric methods. Morover, the sample can be differentiated and new findings can be compared in terms of country groups. Time series analyzes can be examined to make more comments that are specific about these countries, which could be the subject of future research. In this context, the literature review is useful for further research and the researcher.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Notes

1. The model in Equation 1 is named as Double-log model in the literature. Therefore, these results should be interpreted as follows. One per cent change in X (lnRgdp/lnTa/lnCof) will induce a ($B_1/B_2/B_3$) percent change in Y ($lnCO_2$).

References

Acheampong, A. O. (2018). Economic growth, CO_2 emissions and energy consumption: what causes what and where? *Energy Economics,* 74, 677-692. https://doi.org/10.1016/j.eneco.2018.07.022

Adedoyin, F. F., Bekun, F. V., Oana M. D., & Balsalobre-Lorente, D. (2020). The effects of air transportation, energy, ICT and FDI on economic growth in the industry 4.0 era: Evidence from the United States. *Technological Forecasting & Social Change,* 160, 120297. https://doi.org/10.1016/j.techfore.2020.120297

Adedoyin, F. F., Gumede, M. I., Bekun, F. V., Mfonobong, U. E., & Balsalobre-Lorente, D. (2020). Modelling coal rent, economic growth and CO_2 emissions: does regulatory quality matter in BRICS economies? *Science of the Total Environment,* 710, 136284. https://doi.org/10.1016/j.scitotenv.2019.136284

Ahmad, M., Zhao, Z. Y., & Li, H. (2019). Revealing stylized empirical interactions among construction sector, urbanization, energy consumption, economic growth and CO_2 emissions in China. *Science of the Total Environment,* 657, 1085-1098. https://doi.org/10.1016/j.scitotenv.2018.12.112

Ahmed, K., & Long, W. (2012). Environmental Kuznets curve and Pakistan: an empirical analysis. *Procedia Economics and Finance,* 1, 4-13. https://doi.org/10.1016/S2212-5671(12)00003-2

Akadiri, S. S., Alkawfi, M. M., Uğural, S., & Akadiri, A. C. (2019a). Towards achieving environmental sustainability target in Italy. The role of energy, real income and globalization. *Science of The Total Environment,* 671, 1293-1301. https://doi.org/10.1016/j.scitotenv.2019.03.448

Akadiri, S. S., Alola, A. A., & Akadiri, A. C. (2019b). The role of globalization, real income, tourism in environmental sustainability target. Evidence from Turkey. *Science of the Total Environment*, 687, 423-432. https://doi.org/10.1016/j.scitotenv.2019.06.139

Akadiri, S. S., Alola, A. A., Olasehinde-Williams, G., & Mfonobong, U. E. (2020a). The role of electricity consumption, globalization and economic growth in carbon dioxide emissions and its implications for environmental sustainability targets. *Science of The Total Environment*, 708, 134653. https://doi.org/10.1016/j.scitotenv.2019.134653

Akadiri, S. S., Lasisi, T. T., Uzuner, G., & Akadiri, A. C. (2019c). Examining the impact of globalization in the environmental Kuznets curve hypothesis: the case of tourist destination states. *Environmental Science and Pollution Research,* 26(12), 12605-12615. https://doi.org/10.1007/s11356-019-04722-0

Akadiri, S. S., Lasisi, T.T., Uzuner, G., & Akadiri, A. C. (2020b). Examining the causal impacts of tourism, globalization, economic growth and carbon emissions in tourism island territories: bootstrap panel Granger causality analysis. *Current Issues in Tourism,* 23(4), 470-484. https://doi.org/10.1080/13683500.2018.1539067

Aktaş, M. T. (2015). Did Globalization Promote Dirty Industries in Turkey? *International Journal of Business and Social Science*, 6(5), 205-212.

Alam, M. S., & Paramati, S. R. (2017). The dynamic role of tourism investment on tourism development and CO_2 emissions. *Annals of Tourism Research,* 66, 213-215.

Aller, C., Ductor, L., & Herrerias, M. J. (2015). The world trade network and the environment. *Energy Economics,* 52, 55-68. https://doi.org/10.1016/j.eneco.2015.09.008

Alvarado, R., Ponce, P., Criollo, A., Cordova, K., & Khan, M. K. (2018). Environmental degradation and real per capita output: new evidence at the global level grouping countries by income levels. *Journal of Cleaner Production,* 189, 13-20. https://doi.org/10.1016/j.jclepro.2018.04.064

Amar, A. B. (2021). Economic growth and environment in the United Kingdom: robust evidence using more than 250 years data. *Environmental Economics and Policy Studies*, 23, 667-681. https://doi.org/10.1007/s10018-020-00300-8

Amin, S. B., Kabir, F. A., & Khan, F. (2020). Tourism and energy nexus in selected South Asian countries: a panel study. *Current Issues in Tourism,* 23(16), 1963-1967. https://doi.org/10.1080/13683500.2019.1638354

Anser, M. K., Yousaf, Z., Nassani, A. A., Abro, M. M. Q., & Zaman, K. (2020). International tourism, social distribution, and environmental Kuznets curve: evidence from a panel of G-7 countries. *Environmental Science and Pollution Research,* 27(3), 2707-2720. https://doi.org/10.1007/s11356-019-07196-2

Anwar, A., Younis, M., & Ullah, I. (2020). Impact of urbanization and economic growth on CO2 emission: A case of far east Asian countries. *International Journal of Environmental Research and Public Health*, 17(7), 2531.

Aratuo, D. N., Etienne, X. L., Gebremedhin, T., & Fryson, D. M. (2019). Revisiting the tourism-economic growth nexus: evidence from the United States. *International Journal of Contemporary Hospitality Management,* 31(9), 3779-3798. DOI 10.1108/IJCHM-08-2018-0627

Asongu, S. A., & Odhiambo, N. M. (2020). Governance, CO_2 emissions and inclusive human development in sub-Saharan Africa. *Energy Exploration & Exploitation,* 38(1), 18-36.

Ateş, D. (2008). Industrial revolution: Impetus behind the globalization process. *Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi,* 15(2), 31-48.

Ayadi, F. S., Mlanga, S., Ikpor, M. I., & Nnachi, R. A. (2019). Empirical Test of Pollution Haven Hypothesis in Nigeria Using Autoregressive Distributed Lag (Ardl) Model. *Mediterranean Journal of Social Sciences*,10(3), 48-48. Doi: 10.2478/mjss-2019-0041

Ayomitunde, A. T., George, O. A., Ojo, L. B., & Ifeanyi, O. J. (2020). Globalization and Economic Growth: Evidence from European Countries. *European Financial and Accounting Journal*, 15(1), 67-82. DOI: 10.18267/j.efaj.234

Bach, W., & Gößling, S. (1996). Klimaökologische Auswirkungen des Flugverkehrs. *Geographische Rundschau,* 48(1), 54-59.

Baek, J., Cho, Y., & Koo, W. W. (2009). The environmental consequences of globalization: A country-specific time-series analysis. *Ecological Economics,* 68(8-9), 2255-2264.

Balli, E., Sigeze, C., Manga, M., Birdir, S., & Birdir, K. (2019). The relationship between tourism, CO_2 emissions and economic growth: a case of Mediterranean countries. *Asia Pacific Journal of Tourism Research,* 24(3), 219-232.

Balsalobre-Lorente, D., Driha, O. M., & Sinha, A. (2020). The dynamic effects of globalization process in analysing N-shaped tourism led growth hypothesis. *Journal of Hospitality and Tourism Management,* 43, 42-52.

Balsalobre-Lorente, D., Driha, O. M., Bekun, F. F., & Adedoyin, F. F. (2020). The asymmetric impact of air transport on economic growth in Spain: fresh evidence from the tourism-led growth hypothesis, *Current Issues in Tourism,* 24(21), 503-519. DOI:10.1080/13683500.2020.1720624

Balsalobre-Lorente, D., Driha, O. M., Leitao, N. C., & Murshed, M. (2021). The carbon dioxide neutralizing effect of energy innovation on international tourism in EU-5 countries under the prism of the EKC hypothesis *Journal of Environmental Management,* 298, 113513.

Banday, U. J., & Aneja, R. (2019). Energy consumption, economic growth and CO2 emissions: evidence from G7 countries. *World Journal of Science, Technology and Sustainable Development*, 16(1), 22-39.

Blackburne, III E. F., & Frank, M. W. (2007). Estimation of nonstationary heterogeneous panels. *The Stata Journal,* 7(2), 197-208.

Brahmasrene, T., & Lee, J. W. (2017). Assessing the dynamic impact of tourism, industrialization, urbanization, and globalization on growth and environment in Southeast Asia. *International Journal of Sustainable Development & World Ecology,* 24(4), 362-371.

Brida, J. G., Gómez, D. M., & Segarra, V. (2020). On the empirical relationship between tourism and economic growth. *Tourism Management,* 81, 104131.

Burnete, S., & Choomta, P. (2015). Trade and environment: a historical perspective. *Studies in Business & Economics*, 10(2), 17-31. DOI 10.1515/sbe-2015-0017

Cai, Y., Sam, C. Y., & Chang, T. (2018). Nexus between clean energy consumption, economic growth and CO2 emissions. *Journal of Cleaner Production,* 182, 1001-1011.

Candau, F., & Dienesch, E. (2017). Pollution haven and corruption paradise. *Journal of Environmental Economics and Management*, 85, 171-192.

Chen, Y., Wang, Z., & Zhong, Z. (2019). CO_2 emissions, economic growth, renewable and non-renewable energy production and foreign trade in China. *Renewable Energy*, 131, 208-216.

Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance* 20(2), 249-272.

Cole, M. A. (2004). Trade, the pollution haven hypothesis and the environmental Kuznets curve: examining the linkages. *Ecological Economics,* 48(1), 71-81.

Copeland, B. R. (2009). Globalization and the environment. In Anderson, K. (Eds.) (2009). *Australia's Economy in its International Context, Volume 2:1956-2012*, University of Adelaide Press, 575-598.

Dayananda, K. (2016). Tourism and its impact on Indian economy. *IOSR J Hum Soc Sci (IOSR-JHSS),* 21, 24-28.

Demena, B. A., & Afesorgbor, S. K. (2020). The effect of FDI on environmental emissions: Evidence from a meta-analysis. *Energy Policy,* 138, 111192.

Dinda, S. (2004). Environmental Kuznets curve hypothesis: a survey. *Ecological Economics*, 49(4), 431-455.

Dogan, E., & Aslan, A. (2017). Exploring the relationship among CO_2 emissions, real GDP, energy consumption and tourism in the EU and candidate countries: Evidence from panel models robust to heterogeneity and cross-sectional dependence. *Renewable and Sustainable Energy Reviews,* 77, 239-245.

Dong, B., Gong, J., & Zhao, X. (2012). FDI and environmental regulation: pollution haven or a race to the top? *Journal of Regulatory Economics,* 41(2), 216-237.

Doytch, N., & Uctum, M. (2016). Globalization and the environmental impact of sectoral FDI. *Economic Systems,* 40(4), 582-594.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied economics* 38(10), 1091-1110.

Etokakpan, M. U., Adedoyin, F. F., Vedat, Y., & Bekun, F. V. (2020). Does globalization in Turkey induce increased energy consumption: insights into its environmental pros and cons. *Environmental Science and Pollution Research,* 27(21), 26125-26140.

Eyuboglu, K., & Uzar, U. (2020). The impact of tourism on CO_2 emission in Turkey. *Current Issues in Tourism,* 23(13), 1631-1645.

Fethi, S., & Senyucel, E. (2020). The role of tourism development on CO_2 emission reduction in an extended version of the environmental Kuznets curve: evidence from top 50 tourist destination countries. *Environment, Development and Sustainability*, 23, 1499-1524.

Folke, J., Østrup, J. H., & Gössling, S. (2006). Ecotourist Choices of Transport Modes. In Gössling, S., Hultman, J. (Eds.) (2006). *Ecotourism in Scandinavia: Lessons in theory and practice* Helsingborg: Cabi Book, 154-165.

Frankel, J. A. (2003). The environment and globalization. NBER Working Paper Series, Working Paper No, 0090. DOI 10.3386/w10090

Gerçeker, M., Özcan, C. C., Mucuk, M., & Özmen, İ. (2019). Küreselleşme, reel gelir ve turizmin çevre üzerindeki etkisi: Akdeniz ülkeleri örneği. Paper presented at the International Congress of Energy Economy and Security, 8-10 November 2019: İstanbul.

Gokmenoglu, K. K., & Sadeghieh, M. (2019). Financial development, CO_2 emissions, fossil fuel consumption and economic growth: the case of Turkey. *Strategic Planning for Energy and the Environment*, 38(4), 7-28.

Gorus, M. S., & Aydin, M. (2019). The relationship between energy consumption, economic growth, and CO_2 emission in MENA countries: Causality analysis in the frequency domain. *Energy,* 168, 815-822.

Gövdeli, T. (2019). Health expenditure, economic growth, and CO_2 emissons: evidence from the OECD countries. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi* (31), 488-516.

Grossman, G. M., & Krueger, A. B. (1991). Environmental impacts of a North American free trade agreement. NBER Working Paper Series, Working Paper No, 3914. DOI 10.3386/w3914

Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. *The Quarterly Jjournal of Economics,* 110(2), 353-377.

Gunduz, L., & Hatemi-J, A. (2005). Is the tourism-led growth hypothesis valid for Turkey? *Applied Economics Letters,* 12(8), 499-504.

Gurgul, H., & Lach, Ł. (2014). Globalization and economic growth: Evidence from two decades of transition in CEE. *Economic Modelling,* 36, 99-107.

Guzel, A. E., & Okumus, İ. (2020). Revisiting the pollution haven hypothesis in ASEAN-5 countries: new insights from panel data analysis. *Environmental Science and Pollution Research*, 27(15),18157-18167.

Haseeb, A., Xia, E., Baloch, M. A., & Abbas, K. (2018). Financial development, globalization, and CO 2 emission in the presence of EKC: evidence from BRICS countries. *Environmental Science and Pollution Research,* 25(31), 31283-31296.

Honma, S. (2015). Does international trade improve environmental efficiency? An application of a super slacks-based measure of efficiency. *Journal of Economic Structures,* 4(13), 1-12. DOI 10.1186/s40008-015-0023-6

Hosseini, S. J. F., & Soltani, Z. (2011). The role of carbon sequestration project in protecting pastures in Iran. *International Journal of Physical Sciences,* 6(1), 74-78.

Hurlin, C., & Mignon, V. (2007). Second generation panel unit root tests. HAL Open Science, halshs00159842

Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing for unit roots in heterogeneous panels. *Journal of Econometrics,* 115(1), 53-74.

Isik, C., Ongan, S., & Özdemir, D. (2019). The economic growth/development and environmental degradation: evidence from the US state-level EKC hypothesis. *Environmental Science and Pollution Research,* 26(30), 30772-30781.

Jebli, M. B., Youssef, S. B., & Apergis, N. (2019). The dynamic linkage between renewable energy, tourism, CO 2 emissions, economic growth, foreign direct investment, and trade. *Latin American Economic Review*, 28(1), 1-19.

Jun, W., Zakaria, M., Shahzad, S. J. H., & Mahmood H. (2018). Effect of FDI on pollution in China: New insights based on wavelet approach. *Sustainability,* 10(11), 3859.

Kalayci, C., & Hayaloğlu, P. (2019). The impact of economic globalization on CO_2 emissions: the case of NAFTA countries. *International Journal of Energy Economics and Policy,* 9(1), 356-360

Katircioğlu, S. T. (2009). Revisiting the tourism-led-growth hypothesis for Turkey using the bounds test and Johansen approach for cointegration. *Tourism Management,* 30(1), 17-20.

Katircioğlu, S. T. (2014a). International tourism, energy consumption, and environmental pollution: The case of Turkey. *Renewable and Sustainable Energy Reviews,* 36, 180-187.

Katircioğlu, S. T. (2010). International tourism, higher education and economic growth: The case of North Cyprus. *The World Economy,* 33(12), 1955-1972.

Katircioğlu, S. T. (2014b). Testing the tourism-induced EKC hypothesis: The case of Singapore. *Economic Modelling,* 41, 383-391.

Khan, D., & Ullah, A. (2019). Testing the relationship between globalization and carbon dioxide emissions in Pakistan: does environmental Kuznets curve exist? *Environmental Science and Pollution Research*, 26(15), 15194-15208.

Khan, M. K., Khan, M. I., & Rehan, M. (2020). The relationship between energy consumption, economic growth and carbon dioxide emissions in Pakistan. *Financial Innovation,* 6(1), 1-13. https://doi.org/10.1186/s40854-019-0162-0

Khan, M. K., Teng, J. Z., Khan, M. I., & Khan, O. K. (2019). Impact of globalization, economic factors and energy consumption on CO_2 emissions in Pakistan. *Science of the Total Environment*, 688, 424-436. https://doi.org/10.1016/j.scitotenv.2019.06.065

Kim, S., & Park, C. (2020). Durability and Mechanical Characteristics of Blast-Furnace Slag Based Activated Carbon-Capturing Concrete with Respect to Cement Content. *Applied Sciences,* 10(6), 2083.

Koçak, E., Ulucak, R., & Ulucak, Z. Ş. (2020). The impact of tourism developments on CO_2 emissions: An advanced panel data estimation. *Tourism Management Perspectives,* 33, 100611.

Lee, J. W., & Brahmasrene, T. (2013). Investigating the influence of tourism on economic growth and carbon emissions: Evidence from panel analysis of the European Union. *Tourism Management,* 38, 69-76.

Leitão, N. C., & Lorente, D. B. (2020). The linkage between economic growth, renewable energy, tourism, CO_2 emissions, and international trade: The evidence for the European Union. *Energies* 13(18), 4838.

Levin, A., Lin, C. F., & Chu, C. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics,* 108(1), 1-24.

Liu, M., Ren, X., Cheng C., & Wang, Z. (2020). The role of globalization in CO_2 emissions: a semi-parametric panel data analysis for G7. *Science of the Total Environment,* 718, 137379.

Liu, Y., Kumail, T., Ali, W., & Sadiq, F. (2019). The dynamic relationship between CO_2 emission, international tourism and energy consumption in Pakistan: a cointegration approach. *Tourism Review*, 74(4),761-779. Doi 10.1108/tr-01-2019-0006

Lv, Z., & Xu, T. (2018). Is economic globalization good or bad for the environmental quality? New evidence from dynamic heterogeneous panel models. *Technological Forecasting and Social Change,* 137, 340-343. https://doi.org/10.1016/j.techfore.2018.08.004

Mabey, N., & McNally, R. (1999). Foreign direct investment and the environment: From pollution havens to sustainable development. *World Wide Fund for Nature United Kingdom, Surrey*. A WWF-UK Report.

Maddala, G. S., & Wu, S. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and statistics* 61(S1), 631-652.

Magazzino, C. (2016). The relationship between real GDP, CO_2 emissions, and energy use in the GCC countries: A time series approach. *Cogent Economics & Finance,* 4(1), 1152729. https://doi.org/10.1080/23322039.2016.1152729

Maneejuk, N., Ratchakom, S., Maneejuk, P., & Yamaka, W. (2020). Does the Environmental Kuznets Curve Exist? An International Study. *Sustainability,* 12(21), 9117. https://doi.org/10.3390/su12219117

Mazur, A., Phutkaradze, Z., & Phutkaradze, J. (2015). Economic growth and environmental quality in the European Union countries–is there evidence for the environmental Kuznets curve? *International Journal of Management and Economics,* 45(1), 108-126. https://doi.org/10.1515/ijme-2015-0018

McAusland, C. (2008). Globalisation's direct and indirect effects on the environment. Global Forum on Transport and Environment in a Globalising World, 10-12 November 2008, Guadalajara: Mexico

Mert, M., & Caglar, A. E. (2020). Testing pollution haven and pollution halo hypotheses for Turkey: a new perspective. *Environmental Science and Pollution Research,* 27(26), 32933-32943. https://doi.org/10.1007/s11356-020-09469-7

Mikayilov, J. I., Galeotti, M., & Hasanov, F. J. (2018). The impact of economic growth on CO2 emissions in Azerbaijan. *Journal of Cleaner Production,* 197, 1558-1572. https://doi.org/10.1016/j.jclepro.2018.06.269

Moerschbaecher, M., & Day, J. W. (2010). The greenhouse gas inventory of Louisiana State University: a case study of the energy requirements of public higher education in the United States. *Sustainability,* 2(7), 2117-2134. https://doi.org/10.3390/su2072117

Munir, K., & Riaz, N. (2020). Asymmetric impact of energy consumption on environmental degradation: evidence from Australia, China, and USA. *Environmental Science and Pollution Research* 27(11),11749-11759. DOI: 10.1007/s11356-020-07777-6

Nasir, M. A., Canh, N. P., & Le, T. N. L. (2021). Environmental degradation & role of financialisation, economic development, industrialisation and trade liberalisation. *Journal of Environmental Management*, 277, 111471. https://doi.org/10.1016/j.jenvman.2020.111471

Nepal, R., Irsyad, M. I., & Nepal, S. K. (2019). Tourist arrivals, energy consumption and pollutant emissions in a developing economy-implications for sustainable tourism. *Tourism Management*, 72, 145-154. https://doi.org/10.1016/j.tourman.2018.08.025

Ozcan, B., Tzeremes, P. G., & Tzeremes, N. G. (2020). Energy consumption, economic growth and environmental degradation in OECD countries. *Economic Modelling,* 84, 203-213. https://doi.org/10.1016/j.econmod.2019.04.010

Ozcan, C. C., Aslan, M., & Nazlioglu, S. (2017). Economic freedom, economic growth and international tourism for post-communist (transition) countries: A panel causality analysis. *Theoretical & Applied Economics* 2(611),75-98.

Özmen, İ., Gerçeker, M., & Mucuk, M. (2019). BRIC-T Ülkelerinde Ekonomik Büyüme, Dışa Açıklık, Elektrik Tüketimi ve Çevre İlişkisine Yönelik Ampirik Bir Çalışma. *Hacettepe Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi,* 37(4), 675-701. DOI: 10.17065/huniibf.456607

Panayotou, T. (1993) Empirical tests and policy analysis of environmental degradation at different stages of economic development. World Employment Programme Research, Workin Paper, WEP 2-22/WP. 238, International Labour Office: Geneva.

Paramati, S. R., Alam, M. S., & Chen, C. F. (2017a). The effects of tourism on economic growth and CO2 emissions: a comparison between developed and developing economies. *Journal of Travel Research* 56(6), 712-724. https://doi.org/10.1177/0047287516667848

Paramati, S. R., Shahbaz, M., & Alam, M. S. (2017b). Does tourism degrade environmental quality? A comparative study of Eastern and Western European Union. *Transportation Research Part D: Transport and Environment* 50, 1-13. https://doi.org/10.1016/j.trd.2016.10.034

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics,* 61(S1), 653-670.

Pedroni, P. (2001a). Fully modified OLS for heterogeneous cointegrated panels, In Baltagi, B. H., Fomby, T. B., & Carter, H. R. (Eds.) (2001). *Nonstationary Panels, Panel Cointegration, and Dynamic Panels (Advances in Econometrics, Vol. 15)*, Emerald Group Publishing Limited: Bingley, 93-130.

Pedroni, P. (2001b). Purchasing power parity tests in cointegrated panels. *Review of Economics and Statistics,* 83(4), 727-731. https://doi.org/10.1162/003465301753237803

Pesaran, M. H., Shin, Y., & Smith, R. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association,* 94(446), 621-634. https://doi.org/10.2307/2670182

Pesaran, M. H., & Smith, R. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68(1), 79-113. https://doi.org/10.1016/0304-4076(94)01644-F

Radulović, M., & Kostić, M. (2020). Globalization and economic growth of Eurozone economies. *Zbornik Radova Ekonomskog Fakulteta u Rijeci: časopis za Ekonomsku Teorijui Praksu,* 38(1), 183-214.

Rafindadi, A. A., & Usman, O. (2019). Globalization, energy use, and environmental degradation in South Africa: startling empirical evidence from the Maki-cointegration test. *Journal of Environmental Management,* 244, 265-275. https://doi.org/10.1016/j.jenvman.2019.05.048

Rahman, M. M. (2020). Environmental degradation: The role of electricity consumption, economic growth and globalisation. *Journal of Environmental Management,* 253, 109742.Ehttps://doi.org/10.1016/j.jenvman.2019.109742

Rehman, M. U., & Rashid, M. (2017). Energy consumption to environmental degradation, the growth appetite in SAARC nations. *Renewable Energy,* 111, 284-294. https://doi.org/10.1016/j.renene.2017.03.100

Repkine, A., & Min, D. (2020). Foreign-funded enterprises and pollution halo hypothesis: a spatial econometric analysis of thirty Chinese Regions. *Sustainability,* 12(12), 5048.

Sachs, J. D. (2017). Globalization-In the name of which Freedom? *Humanistic Management Journal*, 1(2), 237-252.

Saidi, K., & Hammami, S. (2015). The impact of CO_2 emissions and economic growth on energy consumption in 58 countries. *Energy Reports,* 1, 62-70. https://doi.org/10.1016/j.egyr.2015.01.003

Salahuddin, M., & Gow, J. (2014). Economic growth, energy consumption and CO2 emissions in Gulf Cooperation Council countries. *Energy,* 73, 44-58. https://doi.org/10.1016/j.energy.2014.05.054

Sani, Y. S., Abubakar, I. Y., Adam S. B., Dharwal, M., Singh, P., & Sharma, P. (2020). Economic growth and environmental degradation in developing world: Evidence from Nigeria (1981–2019). *Materials Today: Proceedings,* https://doi.org/10.1016/j.matpr.2020.11.310

Satrovic, E., & Muslija, A. (2019). The empirical evidence on tourism-urbanization-CO_2 emissions nexus. *Advances in Hospitality and Tourism Research,* 7(1), 85-105. DOI: 10.30519/ahtr.484287

Saud, S., Chen, S., Haseeb, A., & Sumeyya (2020). The role of financial development and globalization in the environment: accounting ecological footprint indicators for selected one-belt-one-road initiative countries. *Journal of Cleaner Production* 250, 119518. https://doi.org/10.1016/j.jclepro.2019.119518

Scott, D., Hall, C. M., & Stefan, G. (Eds.) (2012). *Tourism and Climate Change: Impacts, Adaptation and Mitigation.* London: Routledge.

Selvanathan, E. A., Jayasinghe, M., & Selvanathan, S. (2020). Dynamic modelling of inter-relationship between tourism, energy consumption, CO_2 emissions and economic growth in South Asia. *International Journal of Tourism Research,* 23(4), 597-610. DOI: 10.1002/jtr.2429

Sethi, P., Chakrabarti, D., & Bhattacharjee, S. (2020). Globalization, financial development and economic growth: Perils on the environmental sustainability of an emerging economy. *Journal of Policy Modeling,* 42(3), 520-535. https://doi.org/10.1016/j.jpolmod.2020.01.007

Shahbaz, M., Balsalobre, D., & Shahzad, S. J. H. (2019). The influencing factors of CO_2 emissions and the role of biomass energy consumption: statistical experience from G-7 countries. *Environmental Modeling & Assessment,* 24(2), 143-161. https://doi.org/10.1007/s10666-018-9620-8

Shahbaz, M., Khan, S., Ali, A., & Bhattacharya, M. (2017). The impact of globalization on CO2 emissions in China. *The Singapore Economic Review,* 62(04), 929-957. DOI: 10.1142/S0217590817400331

Shahbaz, M., Mallick, H., Mahalik, M. K., & Loganathan, N. (2015). Does globalization impede environmental quality in India? *Ecological Indicators,* 52, 379-393. https://doi.org/10.1016/j.ecolind.2014.12.025

Shahbaz, M., Solarin, S. A., & Ozturk, I. (2016). Environmental Kuznets curve hypothesis and the role of globalization in selected African countries. *Ecological Indicators,* 67, 623-636. https://doi.org/10.1016/j.ecolind.2016.03.024

Shao, Y. (2018). Does FDI affect carbon intensity? New evidence from dynamic panel analysis. *International Journal of Climate Change Strategies and Management,* 10(1), 27-42. DOI 10.1108/IJCCSM-03-2017-0062

Sharif, A., Godil, D. I., Xu, B., Sinha, A., Khan, R. A. S., & Jermsittiparsert, K. (2020a). Revisiting the role of tourism and globalization in environmental degradation in China: Fresh insights from the quantile ARDL approach. *Journal of Cleaner Production,* 272, 122906. https://doi.org/10.1016/j.jclepro.2020.122906

Sharif, A., Saha, S., Campbell, N., Sinha, A., & Ibrahiem, D. (2020b). Tourism, environment and energy: an analysis for China. *Current Issues in Tourism,* 23(23), 2930-2949. https://doi.org/10.1080/13683500.2019.1703913

Shengjuan, H., & Jingping, Z. (2011). Research on the dynamic relationship of the Energy-Economy-Environment (3E) system-based on an empirical analysis of China. *Energy Procedia,* 5, 2397-2404. https://doi.org/10.1016/j.egypro.2011.03.412

Singhania, M., & Saini, N. (2021). Demystifying pollution haven hypothesis: Role of FDI. *Journal of Business Research,* 123, 516-528. https://doi.org/10.1016/j.jbusres.2020.10.007

Stamatiou, P., & Dritsakis, N. (2019). Causality among CO_2 emissions, energy consumption and economic growth in Italy. *International Journal of Computational Economics and Econometrics,* 9(4), 268-286. DOI: 10.1504/IJCEE.2019.102509

Stefan, G. (2010). *Carbon Management in Tourism: Mitigating the Impacts on Climate Change.* London: Routledge.

Sun, H. P., Sun, W. F., Geng, Y., & Kong, Y. S. (2018). Natural resource dependence, public education investment, and human capital accumulation. *Petroleum Science,* 15(3), 657-665. https://doi.org/10.1007/s12182-018-0235-0

Tamiotti, L., The R., Kulaçoğlu, V., Olhoff, A., Simmons, B., & Abaza, H. (2009). *Trade and climate change: a report by the United Nations Environment Programme and the World Trade Organization.* WTO Secretariat: Switzerland. WTO ISBN: 978-92-870-3522-6

Tsou, Y. L., & Edelman, D. J. (2013). Planning for economic growth with reduced CO2 emissions in Provincial China: The case of Jiangxi. *Journal of Urban Management*, 2(2), 45-70. https://doi.org/10.1016/S2226-5856(18)30071-2

Ulucak, R., & Khan, S. U. D. (2020). Does information and communication technology affect CO_2 mitigation under the pathway of sustainable development during the mode of globalization? *Sustainable Development*, 28(4), 857-867. https://doi.org/10.1002/sd.2041

United Nations (1997). Glossary of environment statistics, studies in methods. Seris F No 67. United Nations: New York.

UNWTO and ITF (2019). Transport-related CO_2 emissions of the tourism sector-modelling results. UNWTO: Madrid. DOI: 10.18111/9789284416660

UNWTO (2019). International tourism highlights, 2019 edition. UNWTO: Madrid.

Uzuner, G., Akadiri, S. S. & Lasisi, T. T. (2020). The asymmetric relationship between globalization, tourism, CO_2 emissions, and economic growth in Turkey: implications for environmental policy making. *Environmental Science and Pollution Research,* 27, 32742-32753. https://doi.org/10.1007/s11356-020-09190-5

Wang, J., & Dong, K. (2019). What drives environmental degradation? Evidence from 14 Sub-Saharan African countries. *Science of the Total Environment,* 656, 165-173. https://doi.org/10.1016/j.scitotenv.2018.11.354

Wang, Z., Rasool, Y., Asghar, M. M., & Wang, B. (2019). Dynamic linkages among CO 2 emissions, human development, financial development, and globalization: empirical evidence based on PMG long-run panel estimation. *Environmental Science and Pollution Research,* 26(36), 36248-36263. https://doi.org/10.1007/s11356-019-06556-2

Waqih, M. A. U., Bhutto, N. A., Ghumro, N. H., Kumar, S., & Salam, M. A. (2019). Rising environmental degradation and impact of foreign direct investment: an empirical evidence from SAARC region. *Journal of Environmental Management,* 243, 472-480. https://doi.org/10.1016/j.jenvman.2019.05.001

Warford, J., & Partow, Z. (1989). Evolution of the World Bank's environmental policy. *Finance and Development*, 26(4), 1-24.

Yang, J., Tan, Y., & Xue, D. (2019). The impacts of globalization on city environments in developing countries: A case study of 21 cities in Guangdong Province, China. *Journal of Cleaner Production*, 240, 118273. https://doi.org/10.1016/j.jclepro.2019.118273

Zafar, M. W., Saud, S., & Hou, F. (2019). The impact of globalization and financial development on environmental quality: evidence from selected countries in the Organization for Economic Co-operation and Development (OECD). *Environmental Science and Pollution Research*, 26(13), 13246-13262. https://doi.org/10.1007/s11356-019-04761-7

Zaidi, S., & Ferhi, S. (2019). Causal relationships between energy consumption, economic growth and CO_2 emission in Sub-Saharan: Evidence from dynamic simultaneous-equations models. *Modern Economy,* 10(9), 2157-2173. DOI: 10.4236/me.2019.109136

Zaidi S. A. H., Zafar, M.W., Shahbaz, M., & Hou, F. (2019). Dynamic linkages between globalization, financial development and carbon emissions: Evidence from Asia Pacific Economic Cooperation countries. *Journal of Cleaner Production,* 228, 533-543. https://doi.org/10.1016/j.jclepro.2019.04.210

Zhang, Y., Khan, S. A. R., Kumar, A., Golpira, H., & Sharif, A. (2019). Is tourism really affected by logistical operations and environmental degradation? An empirical study from the perspective of Thailand. *Journal of Cleaner Production,* 227, 158-166. https://doi.org/10.1016/j.jclepro.2019.04.164

Zheng, H., Huai, W., & Huang, L. (2015). Relationship between pollution and economic growth in China: Empirical evidence from 111 cities. *Journal of Urban and Environmental Engineering,* 9(1), 22-31.

Zugravu-Soilita, N. (2017). How does foreign direct investment affect pollution? Toward a better understanding of the direct and conditional effects. *Environmental and Resource Economics,* 66(2), 293-338. DOI 10.1007/s10640-015-9950-9

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