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Tourism and the Mediterranean Experience Amidst Environmental Issues: Fresh Insights from Panel Analysis

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ABSTRACT

According to the United Nations World Tourism Organization (UNWTO), tourism is critical to a country's economic development. It acts as a catalyst for direct and indirect job creation, economic growth, and the attraction of foreign direct investment (FDI). To this end, the present study looks into the relationship between economic growth (GDP), domestic credit (DC), tourism (TR), FDI, and CO_2 emissions for selected Mediterranean countries. This study employs panel corrected standard errors (PCSE) and dynamic ordinary least squares (DOLS) approaches to assure the trustworthiness of the findings. The empirical information gathered supports the idea that tourism adds to pollution in the analyzed blocs. Furthermore, the data supports the pollution haven hypothesis concept by demonstrating that an increase in FDI harms the environment. The study's findings advocate for precautionary actions to alleviate the detrimental effects of tourism-related pollution. Ecotourism policies that support sustainable behaviors must be developed and implemented. Countries can establish a balance between economic growth and environmental protection by implementing such policies. Governments, policymakers, and stakeholders must work together to create effective frameworks and policies that promote responsible tourism. This research fills a knowledge vacuum by shedding light on the specific dynamics of Mediterranean tourism businesses. Economic growth, domestic credit, tourism, FDI, and CO_2 emissions are all linked, according to empirical research. The findings highlight the importance of establishing ecotourism legislation and constructing sustainable infrastructure to reduce tourism's negative environmental impacts. Countries may safeguard the long-term viability of their tourism businesses by finding a balance between economic growth and environmental protection.

Keywords: Green Tourism, Sustainability, Tourism-Emission, Carbon Reduction, Panel Econometrics, Mediterranean Countries
JEL Classifications: C23, C32, O40

1. INTRODUCTION

Environmental sustainability remains a subject of interest (Mehmood et al., 2021) and different factors have been found in empirical studies to be antecedents and drivers of environmental sustainability. These include economic growth (Eluwole et al., 2020), urbanization (Kirikkaleli and Sowah, 2020), population (Orimoogunje et al., 2011), tourism (Lasisi et al., 2020), to mention a few and also in different context. High levels of pollution and economic activity have progressively become alarming in the Mediterranean region, as it is in various parts of the world. The region's environment is one of the richest in biodiversity but is

also considered as one of the most vulnerable. This is because the Mediterranean Sea and its coasts serve the cradle of the region's harvested resources, as well as a major hub for world trade, which has been detrimental to the environment.

Similarly, considering that the region is also characterized by special weather conditions, this also makes the region the preferred destination for international tourism (Tecel et al., 2020; Ferreira et al., 2022; Wang et al.,2022;Ghaderi et al., 2023; Yıldırım et al., 2023). In addition, the political complexity and the characteristics of the region raise concerns and questions for the future trend of the region. As such, our study endeavors to further understand the determinants of environmental sustainability in selected Mediterranean regions using a new econometric tool.

The effect of financial development on carbon emissions has continued to gain attention from academic scholars as well as policymakers. Some studies have argued that financial development is very important in environmental quality because it makes funds available for investment in cleaner energy infrastructure and fosters the adoption of efficient technology because it eliminates financial constraints (Katircioğlu and Taşpinar, 2017) which help in reducing carbon emissions. On the other hand, in financial development, organizations can have easy access to funds, thereby expanding their production activities and promoting organizations and household purchase and use of high energy-consuming gadgets (Acheampong, 2019).

Findings on the emission effect of financial development in empirical research have been mixed (Tecel et al., 2020). Some studies have stated that the environmental quality is deteriorating because of financial development (Amri, 2018; Gill et al., 2019; Mesagan and Nwachukwu, 2018), others have reported otherwise (Adom et al., 2018; Yasin et al., 2020). Some other studies have found an insignificant relationship between financial development and carbon emissions (Chen et al., 2019). Domestic credits and money supply are considered the most prevalent proxies for financial development in the relevant literature (Tecel et al., 2020).

Kwakwa and Adusah-Poku (2020), in their study of domestic credit effect on carbon emission in South Africa, discovered that domestic credit is negatively associated with carbon emissions. Similarly, Shahbaz et al. (2018) found that there is a 0.14-0.24% reduction in the share of clean energy consumption when there is a 1% increase in domestic credit in the case of the "Next 11" and BRICS countries. Li et al. (2021) also found domestic credit to be positively associated with carbon emission both in the long- and short-run in the case of China.

Tourism has continued to be a well research subject by economists and tourism scholars. Several studies have discussed about the tourism-led growth hypothesis (TLGH). Some studies have validated, some debunked, while other have found an insignificant relationship between tourism and economic growth. Another field with respect to tourism is the tourism-led EKC hypothesis, which has also found varied findings like the case of TLGH. The tourism industry provides a wide range of infrastructural services such as telecommunications, railheads, roads, ports, and airports (Koçak et al., 2020) and this has caused deterioration on the environment (Alola et al., 2019; Alola et al., 2021; Lasisi et al., 2020; Dabbous and Tarhini, 2021; Syed and Bouri, 2021; Eslami et al., 2021).

Several studies have confirmed that road transport usage in relation to tourism activities has an impact on the environment. Betta et al. (2021) vans, caravans, and camper vans from tourists mainly influence emissions from tourists in Italy; which was found to be the same in Durbarry and Seetanah's (2015) study of vehicle transport emissions from tourism activities in Mauritius. Similar conclusions have been made by several studies such as (Lenzen et al., 2018; Waked and Afif, 2012). Air travel is also another proxy that has been widely used in the tourism-led EKC and the negative effect of air transport emissions on the environment has been confirmed (e.g. Bekun et al., 2021). Furthermore, other operating sectors (hotel sector [e.g. Tang et al., 2013] and restaurant [e.g. Babakhani et al., 2020]) within the tourism industry have been found to induce carbon emissions.

According to the Environmental Kuznets Curve (EKC) concept, economic growth first degrades the environment, but as the economy grows, environmental conditions improve (Shahbaz and Feridun, 2012). Economic growth is regarded as an external variable in the EKC literature, but carbon emissions are regarded as an endogenous variable. Economic growth has a negative influence on the environment during the early stages of economic development. The ecology, however, begins to recover after a certain degree of economic development is attained (Shahbaz and Feridun, 2012). Studies on the stage at which environmental degradation begins to diminish have yielded a range of outcomes, ranging from two-way causality to no causality at all, yielding equivocal conclusions. The use of diverse control variables in analyzing the relationship between carbon emissions and economic growth can be related to the lack of agreement (Mirza and Kanwal, 2017; Narayan et al., 2016). Granger causality was utilized to assess the relationship between the two variables in 119 countries in a study conducted by Ahmed and Azam (2016). Bidirectional causality was discovered in 18 nations, including the BRICS countries, India, and China (Sebri and Ben-Salha, 2014; Yang and Zhao, 2014; Long et al., 2015). Some research, on the other hand, has discovered a unidirectional causal relationship in which carbon emissions cause economic growth (the emissions-led growth hypothesis, or ELGH). In countries such as Benin, Nigeria, Korea, Bulgaria, and Greece, this relationship has been corroborated (Asumadu-Sarkodie and Owusu, 2016; Chindo et al., 2015; Lee and Yoo, 2016; Obradović and Lojanica, 2017). Several studies, however, have revealed no causal association between economic development and carbon emissions. Oil-rich MENA and BRICS countries were found to be neutral (Gorus and Aydin, 2019; Azevedo et al., 2018). Summarily, the relationship between economic expansion and environmental deterioration is complex and varies throughout economic development phases. While some research supports the idea that economic growth causes environmental damage at first, others imply a more nuanced link. or there is no causality at all. To acquire a better understanding of this complex relationship and build effective environmental regulations, it is critical to continue conducting research and evaluating diverse control

variables.

While FDI-environment nexus literature has been limited, there has been no consensus in empirical results. Variables used, econometric methodology or country analyzed were factors that have caused the controversial results (Shahbaz et al., 2019). The Pollution Haven Hypothesis (PHH) and Pollution Halo Hypothesis (PHaH) depict the two ends of the coin in the nexus. The PHH depicts that the strict environmental policies in developed countries will instigate highly polluting companies to transfer to developing countries, which will lead to pollution of the countries. On the other hand, the PHaH posits that advanced managerial experiences and production technology are provided to developing countries through FDI, with which they can achieve green and cleaner production that results in better environmental quality (Seker et al., 2015).

Based on the arguments above, we infer that the relationship between domestic credits, tourism, economic growth, foreign direct investment, and carbon emission is anything but inconclusive or conclusive. Therefore, this study examines the relationship between these variables in selected Mediterranean countries, using a new econometric technique.

Building on Tecel et al.'s (2020) study validating/debunking the TLGH and FDI-led growth hypothesis in selected Mediterranean countries, our study will add to the body of literature on the tourism-led EKC and confirm the PHH and/PHaH in Mediterranean countries. More importantly, the domestic credit variable, an indicator of financial development has not been well researched in the Mediterranean context. This study will help in bridging this gap. Therefore, the following hypotheses are posited in the study:

Hypothesis 1: Domestic credit will lead to better environmental quality in the selected Mediterranean countries.

Hypothesis 2: The tourism-led emission will be confirmed in the selected Mediterranean countries.

Hypothesis 3: The emission-led growth hypothesis will be validated in the selected Mediterranean countries.

Hypothesis 4: The Pollution halo hypothesis will be validated in the selected Mediterranean countries.

The rest of the study is organized as follows: section 2 includes the model specification, data, and methodology, section 3 includes findings and discussion while section 5 contains the conclusion and policy recommendation.

2. MODEL SPECIFICATION, DATA, AND METHODOLOGY

2.1. Model Specification

To unearth the causal relationship between tourism, economic growth, foreign direct investment, domestic credits, and CO_2 emissions. To achieve this, we followed Ehigiamusoe and Lean (2019a), Ehigiamusoe (2020), and Tecel et al. (2020). Therefore, our model can be specified as follows.

$$CO_2 = f(\text{TR, GDP, DC, FDI}) \quad (1)$$

Following Tecel et al. (2020), natural logarithm has been applied to equation 1. Hence, our model can be modified as follows.

$$\ln CO_{2it} = \ln TR_{it} + \ln GDP_{it} + DC_{it} + FDI_{it} + \varepsilon_{it} \quad (2)$$

Where: CO_2 is CO_2 emissions; TR is tourism; GDI is gross domestic product; DC is domestic credit; FDI is Foreign Direct Investment; ε_{it} represents the disturbance noise term i = cross-sectional dimension in this study case the selected bloc and t = 1995…….2017[1].

2.2. Data

This study is a panel of 14 Mediterranean countries[2] over the period 1995-2017. Several sources have been used to build our data. The data on international tourism receipts, domestic credit, foreign direct investment, and gross domestic product are obtained from the World Development Indicators of the World Bank. While the data of CO_2 emissions were collected from World Development Indicators of the World Bank and British petroleum site.

2.3. Methodology

We used panel data analysis in the present study to investigate the relationship between the studied variables. Given the current state of globalization, it is critical to evaluate cross-sectional dependence, as foreign shocks can have an impact on the countries of interest. We used Pesaran's (2004) work to assess cross-sectional dependence. The results in Table 1 show the presence of cross-sectional dependence. We employed Pesaran (2007) to conduct a unit root test to ensure credible findings and avoid false results. Our panel's results revealed the presence of a unit root. The presence of a unit root needs a cointegration test, as Dossou et al. (2021) emphasize. As a result, we used the approach given by Kao (1999) to investigate the co-integration test.

Table 2 shows that the panel data had a unit root, and all variables had integration of order one [I (1)] at a 1% significance level. The present study leverages on dynamic ordinary least squares (DOLS) and subsequently the panel corrected standard errors approach to account for cross-sectional dependence and examine the co-integrated panel, respectively. We want to provide reliable and meaningful insights into the relationships between the research variables by using these robust estimating approaches. Additionally, the ADF cointegration test was conducted to explore the cointegration properties of the variables under consideration as presented in Table 3. The ADF statistics show long-run equilibrium relationship between the outlined variables over the same period for the Mediterranean bloc.

3. FINDINGS AND DISCUSSION

As shown in Figure 1, Algeria, Tunisia, and Egypt appear to register the highest value in terms of CO_2 emissions, while Turkey has recorded the lowest value. Regarding tourism, the highest

1 The data span is limited due to availability of data and variables under review.

2 The countries include: Albania, Algeria, Bosnia, Croatia, Cyprus, Egypt, France, Greece, Israel, Italy, Morocco, Spain, Tunisia, Turkey.

Table 1: Cross-sectional dependence text

Variables	Statistics	P-value
CO_2	1.206	0.227
TR	9.069***	0.000
GDP	13.679***	0.000
DC	3.3693***	0.000
FDI	2.907***	0.000

***P<0.01

Table 2: Pesaran's cross-sectional augmented Dickey-Fuller

Level	Intercept	Intercept and trend
CO_2	−4.360***	−1.533**
TR	−6.089***	2.465
GDP	−7.363***	1.162
DC	−8.338***	−2.835**
FDI	−9.253***	−5.310***
First difference		
CO_2	−13.742***	−12.644***
TR	−13.560***	−11.912***
GDP	−12.015***	−8.724***
DC	−13.740***	−11.076***
FDI	−16.291***	−15.975***

**P<0.05, ***P<0.01

Table 3: Cointegration test

ADF test	Statistic	P-value
ADF	1.7229**	0.0425

**P<0.05

value has been registered by France while Algeria has appeared to register the lowest value.

Table 4 shows the correlation matrix results, which show a significant positive relationship between numerous variables and CO_2 emissions. For instance, tourism has a negative link with CO_2 emissions. A similar trend is observed between domestic credit and economic growth. For robust empirical analysis, a baseline regression of PCSE and DOLS is fitted to either refute or validate this relationship as outlined by the pairwise analysis.

The results of the dynamic ordinary least squares (DOLS) and panel corrected standard errors (PCSE) analyses on the relationship between tourism, economic growth, foreign direct investment, domestic credit, and CO_2 emissions in selected Mediterranean countries are presented in Table 5. Table 5 shows that domestic financing has a positive and statistically significant impact on environmental degradation. As a result, as domestic credit grows, so does environmental damage. This outcome can be linked to the use of domestic finance for company expansion, which has resulted in higher CO2 emissions and worsening environmental degradation. Domestic finance has also been used as a source of financing for homes to purchase items such as refrigerators and motorcycles, adding to environmental deterioration.

These findings are consistent with those of Lv and Li (2021), who emphasize the importance of financial development in accelerating environmental degradation. However, our findings contradict Odhiambo's (2020) assertion that financial

Table 4: Correlation matrix

Variables	$logCO_2$	logTR	logRGDP	logFDI	logDC
$logCO_2$	1				
logTR	−0.0676**	1			
logRGDP	0.0541*	0.801***	1		
logFDI	0.0680*	−0.188***	−0.231***	1	
logDC	0.000950*	0.185**	0.128*	0.0950	1

Table 5: Result of DOLS and PCSE

Variables	DOLS	PCSE
logDC	0.216***	0.00597**
	(0.040)	(0.018)
logTR	0.737***	0.511***
	(0.092)	(0.072)
logFDI	0.628***	0.0890
	(0.023)	(0.063)
logRGDP	0.788***	0.508***
	(0.398)	(0.062)
Constant		6.710***
		(0.755)
	0.994	0.044
Observations	171	309

Standard errors are in brackets. *P<0.1, **P<0.05, ***P<0.01

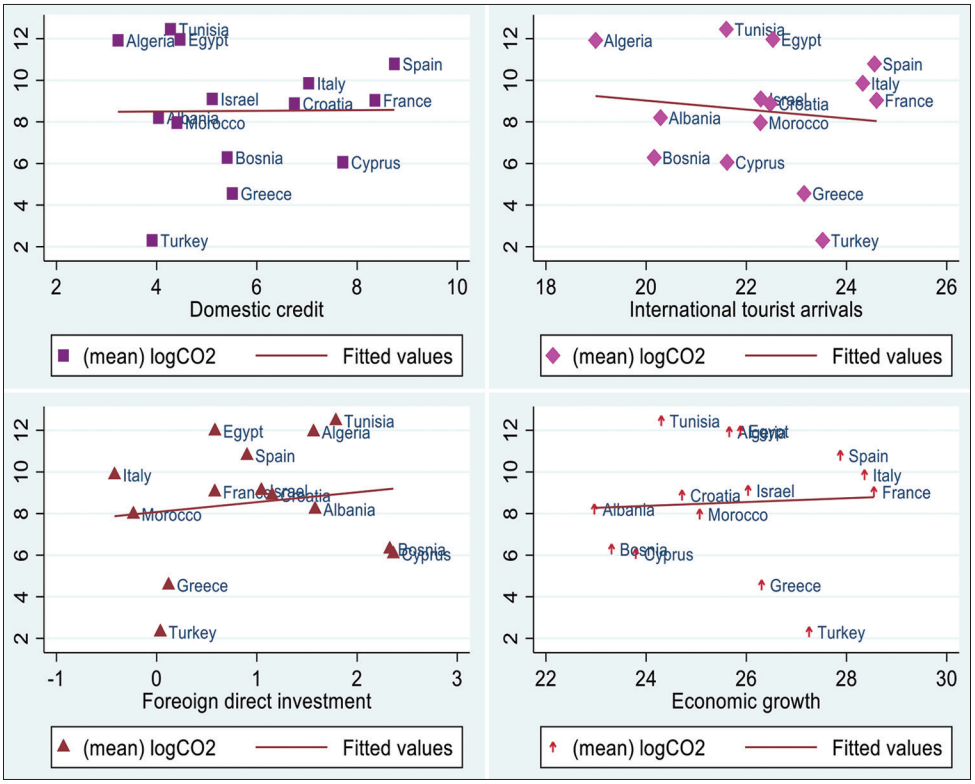
development can promote research and development initiatives to improve environmental quality. These disparities may be due to differences in estimation methodology or various indices of financial development. Similarly, the findings show that tourism has a positive and statistically significant influence on environmental deterioration, implying that increased tourism worsens environmental degradation. This is due to the tourism industry's interdependence with other industries such as transportation (airlines, buses, and motorcycles), manufacturing, and food and beverage, all of which contribute to increased environmental degradation.

Our findings corroborate those of Paramati et al. (2017) and Ehigiamusoe (2020), who investigated the impact of tourism on environmental deterioration in both developed and developing countries. These findings shed light on how domestic credit and tourism have a key rolein contributing to environmental degradation in Mediterranean countries. Understanding these relationships is critical for policymakers to develop effective strategies for sustainable development and environmental protection.

Furthermore, the study's findings show that foreign direct investment has a statistically significant positive impact on environmental degradation. As a result, as foreign direct investment grows, so does environmental damage. This data supports Odhiambo's (2020) argument that foreign direct investment is related to industrialization and the manufacturing sector, resulting in higher energy consumption and CO_2 emissions. Our findings, however, diverge from those of Ehigiamusoe and Lean (2019a), who argue that foreign direct investment can help promote environmental quality through engaging in research and development.

Furthermore, economic growth has a positive and statistically significant impact on environmental degradation. This indicates that increased economic expansion has the potential to exacerbate

Figure 1: The relationship between CO_2 emissions, tourism, domestic credit, and foreign direct investment



environmental degradation. This finding is consistent with Grossman and Krueger's (1991) contention that economic expansion is accompanied by environmental degradation. Recent research has bolstered this claim by demonstrating that economic expansion increases energy consumption and CO_2 emissions, eventually increasing environmental deterioration (Ehigiamusoe and Lean, 2019b; Ehigiamusoe et al., 2020).

These findings emphasize the necessity of assessing the effects of FDI and economic growth on environmental deterioration. Understanding these relationships is critical for designing effective policies and strategies to achieve sustainable development and reduce environmental impact.

4. CONCLUSION AND POLICY DIRECTION

The current study explored the trilateral relationship between economic growth (GDP), domestic credit (DC), tourism (TR), foreign direct investment (FDI), and CO_2 emissions for 14 Mediterranean countries in 1995-2017. Our study employed the novel combination of panel corrected standard errors (PCSE) and dynamic ordinary least square (DOLS) to test the robustness of the aforementioned relationships. The empirical evidence garnered from the study data supported a positive linkage between domestic credit and environmental degradation. That is, the current financial infrastructures in the selected Mediterranean countries are failing in actualizing the global commitment to minimizing the global emission rates. Thus, policymakers such as government officials and key decision-makers in the financial sector can introduce lending policies with incorporated demand for compliance with improving environmental quality. Such policies may include highlighting areas of high pollution-generation potentials and mandating that domestic credits must not be procured for such investments. Although findings from extant literature showed a divergent opinion appertaining to the influence on financial development on environmental quality, the take of the current study is that financial development alone does not influence the environmental quality, however, the infrastructures that such financial development is used to power determines the resulting impact. Hence, care must be taken when domestic credits are approved to ensure that it powers developments that are sustainable and supports the mandate of the Kyoto protocol of controlling pollution.

Further, our findings show that, in the Mediterranean region, the prosperity of the tourism industry has also ushered in a period of increased environmental degradation. In other words, investments in the tourism business have been found to trigger increased environmental pollution. Given the contribution of tourism to the economic prosperity of the Mediterranean countries, it is impossible to suggest that policies be enacted to stiffen the investment in tourism development, however, tourism is a complex industry with several interconnected sectors. Policymakers can focus on varying sectors within the industry and implement "sustainable/eco-friendly" policies that will drive both the viability of the industry and the eco-friendliness of the nations. For instance, since air transportation is a major source of pollution, the government of the Mediterranean countries may look towards investment in sustainable aviation fuels. Such investment will minimize the emission of CO_2 while also supporting the development of tourism business in the region.

Mediterranean countries like the MENA region have witnessed increased environmental degradation owing to increasing income

levels. This unfortunate reality can be traced to the nature of FDIs that are attracted to the region. It is public knowledge that FDI can be dirty or clean depending on the contribution quotient of such inflow to CO_2 emissions. Since our empirical findings show a direct and significant relationship between FDI and CO_2 emissions, it is therefore evident that the FDI flow in the region is more dirty than clean. Thus, policymakers are encouraged to enact and enforce policies that will attract clean FDI such as investments in renewable sources and green technologies.

Lastly, our study found that economic buoyancy worsens environmental degradation in the region. While this finding is not surprising, it will be surprising if the policymakers fail to realize that economic prosperity can foster more positives and beneficiary projects for the region than just making it a pollution haven. To achieve a more balanced ecological ecosystem, the government must encourage investment in less-polluting technologies such as solar and wind. Restrictive policies against pollution-enhancing technologies must be enacted and supported. Overall, efforts towards a total revamp of ecological protective regulations must be a focal point of governmental regulations if the current negative trend of increasing income levels resulting in increased environmental degradation must be reversed.

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