THE IMPACT OF TOURISM AND FINANCIAL DEVELOPMENT ON CARBON EMISSIONS: EVIDENCE FROM EU MEDITERRANEAN COUNTRIES

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Abstract
Purpose - The tourism sector not only contributes significantly to gross domestic product, but also plays an important role in the sustainable economic development of a country. Tourism accounts for approximately 8% of global carbon emissions. From flights and boat trips to souvenirs and accommodations, various activities contribute to tourism emissions. Formulating mitigation measures for sustainable tourism requires an understanding of the factors contributing to the increase in tourism CO_2 emissions. This study analyses the impact of tourism and financial development on CO_2 emissions, while controlling for foreign direct investment (FDI), real income and energy consumption in seven Mediterranean countries that are part of the European Union (Croatia, Cyprus, France, Greece, Italy, Slovenia, and Spain).
Methodology - A dynamic panel regression model was used to understand the impact of tourism and financial development on CO_2 emissions. The analysis was conducted using annual data from 1995 to 2020 for a sample of seven EU Mediterranean countries.
Findings - The empirical results show that the number of tourist arrivals, financial development, real income and energy consumption play an important role in explaining CO2 emissions. Although financial development has an increasing effect on CO2 emissions, tourist arrivals reduce CO2 emissions. It seems that the EU policy to promote sustainable tourism has managed to reduce CO2 emissions. It appears that the tourism sector is using more clean and environmentally friendly technologies in its activities. European countries should continue to take the necessary measures for sustainable tourism.
Contribution - This paper aims to contribute to the existing literature in two ways. First, this study examines the impact of tourist arrivals and financial development on environmental degradation so that appropriate measures can be taken to ensure sustainable tourism. Second, this study focuses on seven Mediterranean countries that are part of the EU and have similar tourism characteristics. The tourism sector in these countries depends heavily on beach tourism. Therefore, the results of this analysis will be of particular interest to policy makers.

Keywords: tourism, financial development, CO_2 emissions, EU Mediterranean countries, panel analysis

INTRODUCTION

Over the past two decades, the relationship between economic activity and environmental degradation has attracted considerable interest. In most cases, increasing economic activity is followed by increasing energy consumption, which is the main cause of environmental degradation. Although the relationship between energy consumption, economic growth and the environment has long been studied, less attention has been paid to the relationship between the environment, tourism and financial development. The number of tourist arrivals and the development of the financial sector

in EU countries have increased rapidly in recent decades as a result of the globalization process. Governments promote the tourism sector through various marketing campaigns to attract international tourists. As a result, tourism is an important source of revenue for many EU countries. In 2021, the travel and tourism sector contributed $1.067 billion to the EU's gross domestic product (GDP), or 6.6 percent of total GDP (World Travel and Tourism Council, 2022). In 2022, there is a recovery in the number of tourist arrivals. The southern Mediterranean Europe continues to show the fastest recovery rates, with some destinations reaching or exceeding pre-pandemic levels (UNWTO, 2022).

However, the tourism sector contributes to CO_2 emissions by increasing energy consumption at every step from transportation to accommodation. Research by World Tourism Organization and International Transport Forum (2019) found that tourism-related emissions accounted for 5% of total man-made emissions in 2016 and are projected to increase by 25% by 2030. The main causes of these negative impacts are mainly due to transport. Therefore, there is still an urgent need to strengthen climate change mitigation measures in the tourism sector, as emissions could quickly increase again once operations resume after a pandemic. In addition, the tourism sector is highly vulnerable to global warming. Reducing CO_2 emissions and strengthening adaptive capacity to climate-related impacts are therefore of paramount importance to the sector's resilience. Due to the importance of the tourism sector to the EU economy, assessing its impact on CO_2 emissions is crucial for designing a sustainable tourism policy.

Financial development is a critical component of economic development: financing entrepreneurship and innovation is widely viewed as the crucial link between finance and growth. According to Usman et al. (2020) an efficient financial sector can play a key role in development of sustainable economy and improve environmental quality. Financial development can be key to promoting environmentally friendly technologies, which can then reduce CO_2 emissions (Pata, 2018). However, Tsaurai (2019) argues that an increase in credit supply leads to an increase in CO_2 emissions in developing countries. Financial development is also important in attracting FDI, as foreign companies have better access to financial services and capital to expand their operations. However, an inefficient, fragile, and fragmented financial market can hinder foreign investment (Ezeoha and Cattaneo, 2012).

Although tourism and financial development are closely related to CO_2 emissions, few studies address their potential impact on the environment, and more importantly, their results are contradictory. This is the motive for studying the relationship between CO_2 emissions, financial development and tourism, taking into account FDI, economic growth and energy consumption in seven EU Mediterranean countries. According to UNWTO (2022), countries on the Mediterranean coast are popular tourist destinations. In 2021 France, Spain, and Italy were among the top 10 international tourist destinations. The strategic location, mineral wealth, and increasing tourism activities are another important reason for studying the role of environmental pollution in the EU Mediterranean countries.

This paper aims to contribute to the existing literature in two ways. The first contribution is to analyse the long run dynamics of the impact of tourist arrivals and financial development on environmental degradation so that appropriate measures can be taken to

ensure sustainable tourism. Secondly, this study focuses on seven Mediterranean countries that are part of the EU and where the same EU policies regarding sustainable tourism are implemented. In addition, the panel methods used in this empirical study take into account cross-sectional dependence and heterogeneity in order to obtain reliable and robust empirical results. Therefore, this study will provide important results for researchers and policy makers.

The rest of the paper is organized as follows: The introduction is followed by a brief literature review of the main studies and findings on the nexus between tourism, financial development and CO_2 emissions. Then, second part explains the model and data. Afterwards, the methods and estimation results are presented and the results are discussed. Finally, concluding remarks are made and limitations of the study are highlighted in conclusion.

1. OVERVIEW OF PREVIOUS STUDIES

Numerous papers have analysed the long run dynamics of energy consumption, economic growth and emissions for various countries. Their results indicate that energy consumption and economic growth cause an increase in CO_2 emissions (Hossain, 2011; Shahbaz et al., 2015). Al-Mulali et al. (2015) found in a panel of 93 countries over the period 1980-2008 that energy consumption increases emission levels, while real income reduces CO_2 emissions in high-income economies. Kasman and Duman (2015), analysing a panel of EU member states and candidate countries over the period 1992-2010, also found that increases in real income lead to environmental improvements.

The importance of mitigating climate change and reducing CO_2 emissions has led to an in-depth study of the impact of tourism and financial development on CO_2 emissions. The available studies can be divided into three parts.

The first group of papers analyses the impact of tourism on CO_2 emissions. Using panel data analysis, Dogan et al. (2017) analysed the relationship between energy consumption, GDP, trade, tourism, and CO_2 emissions in OECD countries for the period 1995-2016, and the results show that tourism development leads to carbon emissions. Similar results were found by Danish and Wang (2018) for BRICS countries and Anser et al. (2020) for G7 countries. Aslan and Dogan (2017) studied the relationship between tourism and CO_2 emissions in 25 EU countries between 1995 and 2011. Using FMOLS and DOLS methods, their results suggest a unidirectional relationship between the tourism sector and CO_2 emissions. Zaman et al. (2016) analysed the relationship between CO_2 emissions and the tourism sector in a panel of East Asia and Pacific, EU, high-income OECD and non-OECD countries. Their results show that the tourism sector increases CO_2 emissions. By applying the ARDL model to annual data from 1970 to 2009, Katircioğlu et al. (2014) found that international tourist arrivals and energy consumption have a significant and positive impact on CO_2 emissions in Cyprus. Similarly, Paramati et al. (2017) found that tourism development in Eastern Europe increases CO_2 emissions while it reduces emissions in Western Europe. Akadiri et al. (2018) found a bidirectional relationship between tourist arrivals and CO_2 emissions in a sample of 16 small island developing countries during 1995-2014. In another study analysing the relationship

between globalisation, real GDP, tourism, and carbon emissions in Turkey from 1970 to 2014, Akadiri et al. (2019) found that by increasing the number of international tourists for 1%, CO_2 emissions increased by 0.129% in the short term and 0.071% in the long term. Similarly, Kocak et al. (2020) analysed the most visited tourist countries in the world from 1995 to 2014 and found that the number of tourist arrivals increased CO_2 emissions. Pulido-Fernandez et al. (2019) analysed the relationship between tourism and sustainable environment in 139 countries during 2007-2016. Using the panel data method, they found that the expansion of the tourism sector has an impact on CO_2 emissions. Qureshi et al. (2017) found similar results for the top 37 tourism countries.

However, some studies emphasize the negative impact of tourism on CO_2 emissions. According to Katircioğlu (2014), an increase in tourist arrivals leads to a decrease in carbon emissions in Singapore. Lee and Brahmasrene (2013) examined the relationship between tourism receipts, FDI, economic growth, and CO_2 emissions in EU countries for the period 1988-2009 using the panel cointegration and Granger causality method. Their results show that tourism receipts reduce CO_2 emissions. Using the Granger causality method, Jebli and Hadhri (2018) also found evidence of the negative impact of tourism on CO_2 emissions. Similarly, the study by Sghaier et al. (2019) shows a decreasing effect between tourism and environmental quality in Egypt, while increasing and neutral effects are found in Tunisia and Morocco.

The second research group consists of work that examines the relationship between financial development and CO_2 emissions. Using a sample of Belt and Road initiative countries over the period 1980-2016, Hafeez et al. (2018) found that financial development significantly increases CO_2 emissions in the long run, while in the short run there is a bidirectional relationship between finance and CO_2 emissions. Similar results were found by Al-Mulali et al. (2015) for 23 selected European countries over the period 1990-2013. On the other hand, Shahbaz et al. (2013a, b) show that financial development reduces CO_2 emissions in South Africa and Malaysia. Similar results were obtained by Shahbaz et al. (2013c) for Indonesia, Shahbaz et al. (2018) for France and by Dogan and Seker (2016) for 23 countries listed in the Renewable Energy Country Attractiveness Index. According to Nasreen et al. (2017), financial stability reduces CO_2 emissions in five South Asian economies. Jalil and Feridun (2011) also found the same results for China. In addition, Tamazian et al. (2009) found that higher levels of financial development in BRIC countries led to reduced CO_2 emissions, with liberalization and financial openness playing a key role. Tamazian and Rao (2010) confirmed these findings using a sample of 24 transition countries, but pointed out that financial liberalization needs to be supported by efficient and strong institutions. However, Jamel and Maktouf (2017) found no causality between financial development and CO_2 emissions in 40 European economies over the period 1985-2014.

The third group of papers addresses the impact of tourism and financial development on CO_2 emissions. Isaeva et al. (2021) examined the causality between energy consumption, CO_2 emissions, financial development, and tourism using a sample of 12 post-communist countries between 1995 and 2014 and their results suggest that tourism and financial development increase CO_2 emissions. The authors argue that policy makers should encourage the rapid adoption of efficient and environmentally friendly technologies through low-cost financing for the private sector. In addition, further expansion of the

tourism sector should be accompanied by the use of efficient and environmentally friendly technologies that have lower environmental impacts. Işik et al. (2017) examine the causality between economic growth, financial development, international trade, tourism expenditure and carbon emissions in Greece from 1970 to 2014. According to their results, tourism spending, financial development, international trade and economic growth cause CO_2 emissions.

Overall, there are only few studies that examine the impact of tourism and financial development on CO_2 emissions and the results are inconclusive. To overcome the shortcomings of the literature, this study analyses the long run relationship between CO_2 emissions, tourist arrivals and financial development, controlling for FDI, energy consumption and real income. The analysis is conducted for a panel of the seven EU Mediterranean countries over the period 1995-2020 using dynamic panel estimation techniques.

2. DATA AND MODEL

This study uses CO_2 emissions as the dependent variable and tourist arrivals, financial development, foreign direct investment, energy consumption and gross domestic product as independent variables. The following model is used to test the relationship between the selected variables:

$$lnCO_{2\,i,t} = \beta_i + \beta_1 lnTOUR_{i,t} + \beta_2 lnFD_{i,t} + \beta_3 lnFDI_{i,t} + \beta_4 lnGDP_{i,t} + \beta_5 lnEC_{i,t} + e_{i,t} \quad (1)$$

where CO_2 emissions are carbon dioxide gas emissions in metric tons; TOUR is number of international tourist arrivals; FD is financial development measured as domestic credit to the private sector (% of GDP); FDI is net foreign direct investment inflows in current US$; GDP is real gross domestic product in constant 2015 US$; and EC is gross inland energy consumption in kilotons of oil equivalent (KTOE). The annual data for all variables are from the World Development Indicators database for period 1995-2020.

Seven EU Mediterranean countries are considered in this study, namely Croatia, Cyprus, Spain, France, Greece, Italy, and Slovenia. All variables are expressed in natural logarithm, so the coefficients can be interpreted as elasticities of CO_2 emissions with respect to tourist arrivals, financial development, foreign direct investment, energy consumption and gross domestic product.

Table 1 summarizes the descriptive statistics of these six variables for the observed countries. The mean, standard deviation, minimum and maximum values were calculated for each variable.

Table 1: **Descriptive statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
CO_2	182	178.052	175.597	5.874	502.255
TOUR (million)	182	58,7	62	0,732	218
FD	182	90.9	51.8	0.186	255.3
FDI (million)	182	16.000	21.200	-22.100	85.100
GDP (million)	182	788.000	885.000	12.700	2.620.000
EC	182	85.742	94.244	1.974	277.274

Source: Own calculation.

Carbon dioxide emissions in the seven EU Mediterranean countries averaged 178 kilotons in 1995-2020. The highest value was recorded in Italy in 2005 (502 kilotons), while the lowest value was recorded in Cyprus in 1995 (5 kilotons). On average, there were 58 million international tourist arrivals in seven EU Mediterranean countries, with the highest recorded in France in 2019 (218 million) and the lowest in Slovenia in 1995 (732.000). In terms of financial development, the average share of domestic credit to the private sector in our sample is 90% of GDP, with the lowest recorded for Slovenia in 2001 and the highest for Cyprus in 2013. The average value of FDI was 16 billion. The highest value was recorded in France in 2005 and the lowest in Italy in 2020. The average value of GDP was US$788 billion. The country with the highest GDP was France in 2019, while the lowest value was recorded in Cyprus in 1995. The country with the highest energy consumption was France in 2005 (277 Mtoe) and the country with the lowest energy consumption was Cyprus in 1995 (1.9 Mtoe).

Table 2. displays a summary statistics on the selected variables of the sample countries

Table 2. **Summary statistics**

	CO_2	TOUR (million)	FD	FDI (million)	GDP (million)	EC
Cyprus	7,344	3	178	15,400	18,900	2,476
Spain	294,390	89	123	31,500	1,110,000	126,323
France	388,133	186	89	42,800	2,240,000	259,861
Greece	92,787	19	81	2,000	212,000	26,873
Croatia	20,052	43	52	1,680	47,300	8,962
Italy	427,982	69	76	17,600	1,850,000	168,796
Slovenia	15,677	2	38	767	39,100	6,902

Source: Own calculation.

Among the countries in the sample, Italy and France have the highest CO2 emissions and final energy consumption (EC). GDP is significantly higher in France, while other countries with higher GDP are Italy and Spain. These countries also have the highest number of tourist arrivals. Interestingly, Cyprus has the highest share of domestic credit

to the private sector, while Slovenia has the lowest. The value of FDI is significantly higher in France and Spain, while it is lowest in Slovenia.

3. METHODS AND EMPIRICAL RESULTS

EU countries are interdependent among each other because of trade, foreign direct investment, etc., and are more likely to be interdependent cross-sectionally. Shocks that occur in one country affect other countries in the region, so accounting for cross-sectional dependence (CD) is necessary to obtain more consistent and unbiased results (Bilgili, et al., 2017). To test for the presence of cross-sectional dependence in the dataset, the test of Pesaran (2007, 2015) was applied. Second-generation unit root tests, the CADF and the CIPS unit root tests were used because they are robust to the issues of cross-sectional dependence. These tests provide consistent and reliable results in the presence of CD. The empirical results of the CD and unit root tests are presented in Table 3 and confirm the presence of cross-sectional dependence, suggesting that shocks in one country spread to other countries in the panel.

Table 3: **Results of cross-sectional dependence test and unit-root tests**

		CADF		CIPS	
Variable	CD-test	Level	Difference	Level	Difference
lco_2	16.628***	-0.956	-2.715***	-1.727	-5.405***
ltour2	17.589***	-1.693	-2.513**	-1.863	-3.606***
lfd	17.337***	-1.695	-2.133	-0.995	-2.344**
lfdi	5.538***	-2.513***	-4.730***	-1.170	-4.342***
lgdp	18.284***	-1.209	-2.755***	-0.928	-3.110***
lec	18.324***	-1.304	-2.605**	-1.931	-5.771***

Notes: ** and *** denote the statistical significance at 5 % and 1 % level.
Source: Own calculation

According to the results in Table 3, carbon emissions, tourist arrivals, financial development, foreign direct investment, real income and energy consumption become stationary at their first differences. The results are statistically significant at the 1% level so it can be conclude that the variables under study are integrated of order one.

According to Pedroni (1999), the idea of cointegration is based on the assumption that linear combination for the set of variables that are first order integrated can be stationary. In this study, the Pedroni cointegration test (Pedroni, 1999) and the Westerlund cointegration test (Westerlund, 2005) are used to test whether the variables under study move together in the long run. The results of the cointegration tests are shown in Table 4.

Table 4: **Results of cointegration tests**

Pedroni cointegration		Westerlund cointegration	
	Statistics		Statistics
Modified Phillips-Perron t	1.9870**		
Phillips-Perron t	-4.4123***	Variance ratio	-1.5585**
Augmented Dickey-Fuller t	-3.4232***		

Notes: **, *** represents the statistical significance at 5% and 1% level
Source: Own calculation

The results show that all variables are cointegrated and thus exhibit a long-run relationship.

This study further applies the mean group (MG) and the pooled mean group (PMG) estimator in order to obtain accurate and robust estimates of the long-run coefficients on the effects of tourism, financial development, foreign direct investment, energy consumption and economic growth on CO_2 emissions. The results are presented in Table 5.

Table 5: **Estimation results of the dynamic panel model**

Variables	**EU Mediterranean countries**	
	PMG	**MG**
Long-run coefficients		
ltour	-0.187***	-0.205
	-0.0215	-0.1316
lfd	0.070***	-0.098
	-0.0191	-0.0873
lfdi	0.005	0.014**
	-0.0034	-0.0062
lgdp	-0.479***	-0.222
	-0.081	-0.2581
lec	1.745***	1.189***
	-0.0961	-0.2347
Short-run coefficients		
Error correction coefficients	-0.296**	-0.649***
	-0.1412	-0.0689
Δ*ltour*	-0.002	0.073
	-0.0325	-0.0735
Δ*lfd*	0.012	0.143**

Variables	**EU Mediterranean countries**	
	-0.0382	-0.0688
Δ*lfdi*	-0.002	-0.005
	-0.0028	-0.0045
Δ*lgdp*	0.440***	0.331*
	-0.1631	-0.1692
Δ*lec*	0.543***	0.267***
	-0.1945	-0.1015
cons	2.502**	5.310***
	-1.2112	-1.5754
Number of observations	165	165
Number of groups	*7*	*7*
Hausman test	7.88	
	[0.1631]	

Note: The asterisks *, **, ***, indicate significance level of 10%, 5% and 1%. The p-value for the Hausman specification test is given in square brackets.
Source: Own calculation.

The long elasticity of carbon emissions with respect to tourist arrivals is negative and significant, which means that an increase in tourist arrivals leads to a lower level of emissions in the seven EU-Mediterranean countries. This means that the tourism sector is not a pollution problem in the sample countries. One possible reason for this is that in the last fifteen years the EU has adopted policies to promote sustainable tourism. For example, in 2007 the "Agenda for a sustainable and competitive European tourism" was adopted. The main objective of the agenda was to "improve the competitiveness of the European tourism industry by creating more and better jobs through the sustainable growth of tourism in Europe and globally" (Commission of the European Communities, 2007, p.2). In 2010, another policy was adopted "Europe, the world's No. 1 tourist destination - a new political framework for tourism in Europe" (European Commission, 2010), which identified several priorities for action, including promoting the development of sustainable, responsible and high-quality tourism, for which a rolling implementation plan was developed. In 2014, the "European Strategy for more growth and jobs in coastal and maritime tourism" (European Commission, 2014) was adopted. This document focused on the challenges to be addressed and proposed a strategy to improve the sustainability and competitiveness of the tourism sector.

This result of decreasing effect of tourist arrivals on CO2 emission is consistent with the findings of Lee and Brahmasrene (2013), Katircioğlu (2014), Jebli and Hadhri (2018) and Sghaier et al. (2019). However results are not in line with studies of Dogan et al. (2017) for OECD countries, Danish and Wang (2018) for BRICS countries, Anser et al. (2020) for G7 countries, Aslan and Dogan (2017) for 25 EU countries, Zaman et al. (2016) for a panel of East Asia and Pacific, EU, high-income OECD and non-OECD countries, Katircioğlu et al. (2014) for Cyprus, Akadiri et al. (2019) for Turkey, Kocak et al. (2020) for the most visited tourist countries in the world, Pulido-Fernandez et al. (2019) for 139 countries and Qureshi et al. (2017) for the top 37 tourism countries.

The estimated long-run regression shows a positive impact of financial development (FD) on CO_2 emissions. Specifically, a 1% increase in FD means a 0.070% increase in CO_2 emissions. It is interesting to notice that FDI has no impact on CO2 emissions. It seems that all the impact is through financial development as FDI is a key part of it. Similar results were found by Hafeez et al. (2018) for a sample of Belt and Road initiative countries and by Al-Mulali et al. (2015) for 23 selected European countries. However this result is not in line with studies by Shahbaz et al. (2013a, b) for South Africa and Malaysia, Shahbaz et al. (2013c) for Indonesia, Shahbaz et al. (2018) for France, Dogan and Seker (2016) for 23 countries listed in the Renewable Energy Country Attractiveness Index, Nasreen et al. (2017) for five South Asian economies, Jalil and Feridun (2011) for China, Tamazian et al. (2009) for BRIC countries and Tamazian and Rao (2010) for 24 transition countries.

GDP has a negative impact on CO_2 emissions that is indirectly related to the Environmental Kuznets Curve (EKC) hypothesis. The EKC hypothesis states that an increase in real income leads to environmental improvements in a country after the country exceeds a threshold in income. Since the 7 EU Mediterranean countries belong to high-income economies according to the World Bank classification, they should be above the income threshold. The existence of the EKC hypothesis is also supported by many studies that focus on EU countries and high-income countries. The EKC hypothesis is confirmed for France (Iwata et al., 2010), Spain (Esteve and Tamarit, 2012) a panel of Central and Eastern European countries (Atici, 2009) and a panel of EU and candidate countries (Kasman and Duman, 2015).

It is noteworthy that although financial development has an increasing impact on CO2 emissions, tourist arrivals reduce CO2 emissions. This suggests that the tourism sector in Mediterranean countries does not cause environmental degradation. It seems that the EU policy to promote sustainable tourism has been able to reduce CO2 emissions. It seems that the tourism sector is using cleaner and environmentally friendly technologies in its operations. European countries should continue to take the necessary measures to protect the environment and raise awareness about sustainable tourism.

As expected, energy consumption significantly and positively influences CO_2 emissions. This result suggests that an increase in energy consumption leads to higher CO_2 emissions, which is consistent with existing studies such as Hossain (2011), Shahbaz et al. (2015) and Al-Mulali et al. (2015).

The ECT coefficient of -0.296 reflects the time in which CO_2 will return to equilibrium. In the long run, it takes about 3.5 years for CO_2 emissions to return to equilibrium if they deviate from the regression line (taken as 1 / 0.296).

CONCLUSION

In recent decades, the tourism, energy and financial sectors have grown significantly in Mediterranean countries. Therefore, there is a great need to understand the interaction between tourism, financial development and carbon dioxide emissions in the EU

Mediterranean countries. This paper concentrated on examining the impact of tourist arrivals, financial development, foreign direct investment, energy consumption and economic growth on carbon dioxide emissions for 7 EU Mediterranean countries during the period 1995-2020. Since the studied countries are very heterogeneous in terms of number of tourist arrivals and financial development, the PMG estimator was used.

The results show that the hypothesis of a growth in CO_2 emissions caused by tourism is not valid. It is shown that CO_2 emissions decrease as the number of tourist arrivals increases. Moreover, economic growth also reduces CO_2 emissions, which confirms the EKC hypothesis. However, financial development and energy consumption lead to an increase in CO_2 emissions, which means that financial institutions still mainly finance projects that pollute the environment.

In order to reduce CO_2 emissions, the development of the financial sector must be addressed. Therefore, policymakers should encourage and incentivize the adoption of efficient and environmentally friendly technologies through low-cost financing for the private sector. They should also promote environmental finance that is more accessible and equitable for the underprivileged or financially excluded. Financial institutions should finance environmentally friendly projects and develop a system to ensure that allocated funds are not invested in environmentally harmful activities. In addition, further development of the financial sector should be directed toward providing funding for non-processing industries such as sustainable tourism, which increases economic growth but decreases CO_2 emissions.

As climate change also impacts the tourism sector, allocating a certain portion of the government budget to green infrastructure development can both support tourism sector development and reduce the environmental impacts of urbanisation, transport, and industry (Nepal et al., 2019). Policymakers should continue to implement measures that significantly reduce CO_2 emissions and promote sustainable tourism.

Based on the empirical results, two recommendations are made for policymakers. The first is that policymakers need to act appropriately to improve the financial system and encourage financial institutions to finance green infrastructure and hybrid technology projects, especially in transportation and services. The second recommendation is that the public sector should encourage renewable and clean energy generation in the economy, especially in the tourist destinations, through subsidies or tax exemptions.

A limitation of the study is that the data are not available for a longer time period. Second, the results offered in study refer to the EU Mediterranean countries and the findings may not be applicable to other countries or regions due to differences in economic, political, and cultural factors. Further research should be extended to other Mediterranean countries and to compare the results with ones that are not part of the EU. It would also be interesting to analyse each year and each country separately.

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