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Tourism Activities in the Context of Ecological Footprint: Panel Data Analysis for Mediterranean Countries

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ABSTRACT

Tourism is seen as one of the important sources of economic growth in developing countries. It makes positive contributions to the country's economy, with national income, foreign currency inflow and employment created. While the basis of investments in the tourism sector is primarily to achieve economic gains, today is the sustainable tourism concept emerged and the effects of tourism on the environment have come to the fore. Sustainability in tourism emerges as a new tourism approach that takes environmental damage into consideration. The aim of this study is to examine the relationship between tourism activities and ecological footprint in countries bordering the Mediterranean, using annual data for the period 2001-2021. In the analysis; Generalized Moment Method (GMM), system GMM, constant effects model and random effects models were used. The results of the analysis showed that tourism activities have a significant and positive impact on the ecological footprint of countries bordering the Mediterranean. The findings obtained from the study confirm the expectations that tourism activities increase the ecological footprint by causing environmental degradation.

Keywords: Ecological Footprint, Tourism Economy, Ecological Economics, Panel Data Analysis.

JEL Classification Codes: Q57, F43, C52, C23, P28

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INTRODUCTION

Tourism, which has been one of the fastest growing sectors in the world since the second half of the 20th century, has added a new dimension to the international trade economy. Today, reasons such as technological advances, improvement in living standards and freedom of travel brought about by globalization have made tourism one of the fastest growing sectors in the world. The tourism sector contributes to the development of country economies by providing opportunities such as employment and investment (Selvanathan et al., 2020: 1). It contributes to the economic, political, social and cultural development of many developing countries.Foreign exchange inflows obtained through invisible exports as a result of tourist activities have become an important source for countries. The foreign exchange input obtained makes a significant contribution to the balance of payments of the countries. Its positive contributions to national income, increase in employment volume and regional development are an undeniable fact (Belisle and Hoy, 1980, Holzner, 2011). As a matter of fact, insufficient capital and technology gap in developing countries have made tourism, which is a labor-intensive sector, more attractive (Öztürk and Yazıcıoğlu, 2002:185). Countries that do not have sufficient resources and development potential in agriculture and industry, but have tourism supply potential; The tourism sector will support the development of the country, to the extent that it can implement planned and effective tourism policies. Depending on the development of the tourism sector, physical infrastructure problems such as roads, water, electricity, sewage and communication will disappear in these regions. Thus, tourism will also contribute to increasing the regional standard of living (Çeken, 2008: 302).

People's consumption activities also increase during tourism activities. The increase in the amount of waste along with the large amounts of increased energy and water consumption causes environmental damage (Jebli et al., 2019; Paiano et al., 2020). In addition, since the tourism industry is a sector that requires high energy, it negatively affects nature by increasing carbon dioxide emissions. The factor that increases carbon dioxide emissions the most during tourism activities is; it arises from transportation, cooking, heating and cooling processes in which solid fuels are used extensively during these activities (Gössling, 2000: 410). The increase in greenhouse gas emissions that cause

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global warming, climate change and water pollution are caused by increasing tourism activities (Sun and Liu, 2020). Transportation activities, especially tourism-related, threaten all living things by increasing the world temperature (Scott et al., 2016; Rico et al., 2019).

While the aim of investments in the tourism sector is primarily to obtain economic gains, today the concept of sustainable tourism has come to the fore by drawing attention to the effects of tourism activities on environmental quality. Aiming only at the economic benefits of tourism; Not using renewable resources in a controlled manner causes natural resources to face the danger of extinction over time (Selvanathan et al., 2020; Godfrey, 1996). These negative effects of tourism activities on nature destruction increase the ecological footprint. The value resulting from the production of resources that people will consume and the elimination of waste generated during this production process is called ecological footprint (Wackernagel et al., 1999; GFN-Turkey, 2012). The way to reduce the ecological footprint will be possible by switching to a tourism approach that raises sustainable environmental awareness and takes social and environmental factors into consideration.

The purpose of this study is to question the effects of tourism on the ecological footprint in countries bordering the Mediterranean, where tourism activities are intense. For this purpose, the relationship between tourism and ecological footprint in countries bordering the Mediterranean was examined with the Dynamic Generalized Moment Method (GMM) using annual data covering the period 2001-2021. The findings to be obtained from the research are limited by the variables used in the analysis, the period covered by the analysis and the econometric method used. The study aims to contribute to the limited empirical literature on this subject and to provide a resource for future studies in this field by raising awareness about the environmental damage of tourism activities in countries bordering the Mediterranean in terms of using the ecological footprint variable, which is more comprehensive. In the section following the introduction, a summary of the literature on the subject is included. Then, the environmental damage of tourism activities and the theoretical framework regarding sustainable tourism are discussed. After the data set, econometric method and empirical findings were presented, the findings were evaluated and suggestions were made.

EMPIRICAL EVIDENCE

Studies examining the effects of tourism activities on nature destruction; They are summarized in two groups: the relationship of tourism activities with CO2 emissions and the relationship of tourism activities with the ecological footprint.

Tourism and Carbon Emission Nexus

In the studies conducted, CO2 emission was considered as the most important factor showing the destruction of nature. Many researchers have examined the environmental impacts of tourism activities using CO2 emissions. For example, Lee et al. (2013) used panel data analysis for the years covering the period 1988-2009 in EU countries, examining the effects of tourism activities on GDP and carbon dioxide emissions. While the findings confirm the positive effect of GDP on carbon dioxide emissions; Contrary to other studies, it has been found that tourism activities have a negative impact on carbon dioxide emissions. Banday et al. (2014) found a strong intercourse between tourism income and economic growth in their study to examine the effects of tourism income on economic growth and on pollution. It has been concluded that tourism income is one of the most important sources affecting economic growth in Kashmir. It has also revealed the negative effects of pollution and tourism revenue that affect environmental sustainability, such as degradation of natural resources. Vita et al. (2015) tested the environmental effects of developments in tourism with the Environmental Kuznets Curve model. Accordingly, there is a cointegrated relationship between the number of international tourists coming to Turkey, tourism income, energy consumption and carbon dioxide emissions. The empirical results showed that CO2 emissions decreased in the long, supporting the Environmental Kuznets Curve hypothesis. It also draws attention that despite the environmental degradation resulting from the development of tourism, sufficient importance is not given to policies to protect the environment. Likewise, in the study conducted by Isik et al. (2017) analyzed the impact of GDP, economic development, international trade and tourism expenditures on CO2 emissions in Greece with the help of data for 1970-2014. According to the results of Zivot-Andrews unit root tests, ARDL models and Vector Error Correction Model (VECM), it has been determined that economic growth, financial development, international trade and tourism expenditures increase CO2 emissions. Jebli et al. (2018) investigated the relationship between international tourism and energy consumption in the

top ten international tourism destinations that attract the most tourists for the period 1995–2013, using the Vector error correction model and Granger causality test. There is unidirectional causality from economic growth to CO2 emissions. On the other hand, it was concluded that there is a bidirectional causality between international tourism activities, economic growth and energy use. Balli et al. (2019) examined the relationship between tourism, economic growth and CO2 emissions using panel data analysis for Mediterranean countries, showed the existence of a positive relationship between tourism and CO2 emissions in the long run. Arı (2021), who researched also the relationship between GDP, tourism, renewable energy and carbon dioxide data for Turkey, used the FMOLS method in his study. According to the results obtained, renewable energy reduced carbon dioxide emissions. On the other hand, it has been concluded that developments in the tourism industry do not have a significant effect on carbon dioxide emissions and that policies that encourage tourism will not negatively affect nature. Meşter et al. (2023), who examined the intercourse between developments in the international tourism sector, GDP and CO2 emissions for 27 EU countries in the period covering 1995–2019, used the ARDL approach in their study. The results of the research supported the positive relationship of tourism on per capita GDP and CO2 emissions in EU countries.

Tourism and Ecological Footprint Nexus

Today, increasing production and consumption activities lead to more energy use and increase CO2 emissions. However, CO2 emissions constitute a very small part of nature destruction. With this reality, in order to measure the magnitude of nature destruction caused by tourism activities, it is necessary to use the concept of ecological footprint, which is a more comprehensive indicator that considers more factors. Uncontrolled use of natural resources due to the increasing consumption activities of societies as well as developing tourism activities has brought the concept of ecological footprint to the agenda.

In this context, the relationship between tourism and environmental damage; They were examined in three categories: studies that increase the ecological footprint of tourism activities, studies that have a healing effect on the ecological footprint of tourism activities in the long term, and studies that do not have a significant relationship between tourism activities and ecological footprint.

Bagliani et al. (2004) examined the impact of tourism on the ecological footprint for Venice. According to the results obtained, tourism activities increase the ecological footprint by 8.5%. Leon et al. (2014) studied the intercourse between tourism and ecological footprint for underdeveloped and developed countries for the period 1998-2006 using the STIRPAT approach. According to the analysis, it has been determined that tourism has a significant impact on the carbon footprint in both underdeveloped and developed countries. Godil et al. (2020) investigated the impact of financial development, tourism, and globalization on the ecological footprint in Turkey in the period covering the years 1986-2018 using the QARDL method. Kongbuamai et al. (2020a) investigated the relationship between tourism activities and ecological footprint in ASEAN countries using the Driscoll-Kraay estimation method using data between 1995 and 2016, revealed that tourism activities are negatively related to the ecological footprint. The empirical results obtained showed that the number of tourists, globalization and financial development had a eloquent and positive relationship on the ecological footprint. In their study, Younes et al. (2020) examined the impact of tourism activities on the ecological footprint. Statistical analysis was conducted by distributing 611 surveys to randomly selected tourists from different nationalities. The study found that there is a positive relationship between tourism activities and ecological footprint. Ansari et al. (2021) examined the intercourse between tourism activities and ecological footprint in the top 5 countries that attract the most tourists (USA, Spain, France, Italy and China), in their study using panel NARDL analysis. The result of the research shows that the number of incoming tourists increases the ecological footprint. Alola et al. (2021) examined the relationship between the number of tourists and ecological footprint in 10 tourism centers (France, USA, Spain, China, Italy, England, Germany, Mexico, Thailand and Turkey) in the period of 1995-2016, used the Pooled Mean Group (PMG) method in the study. According to the results obtained, it was determined that there was a positive relationship between the number of tourists and the ecological footprint. Anser et al. (2021) in the research conducted using the Generalized Method of Moments (GMM) using annual data between 1995 and 2018 for 130 countries; The relationship between population density, number of tourists, economic growth and ecological footprint was investigated. In another study conducted for Turkey, Kutlu et al. (2022) examined the intercourse between tourism and ecological footprint for the

period 1970-2017 according to the ARDL boundary test approach. GDP, energy consumption, tourism revenues, tourism expenditures and natural resource cost data were used in the study. According to the findings of the research; Energy use and tourism expenditures increase the ecological footprint. Adedoyin et al. (2022) investigated the causality relationship between the number of incoming tourists and ecological footprint in a study using the Dumitrescu and Hurlin panel causality test. According to the results obtained, the number of incoming tourists increases the ecological footprint, causing a decrease in environmental quality. Guan et al. (2022), who evaluated the effects of international tourism on the ecological footprints of G-10 countries in the period 1995–2019 with the CS-ARDL method, show that tourism significantly increases the ecological footprint. The study conducted by Liu et al. (2022) using the ARDL bound test and Bayer and Hanck tests covers the years between 1980-2017. The effect of tourism, GNP, energy use, commercial openness and FDI on the ecological footprint in Pakistan is examined with Environmental Kuznets Curve (EKC). The obtained results confirm the EKC hypothesis. In addition, the fact that foreign direct investments increase the ecological footprint shows that the Pollution Haven Hypothesis is supported. When we look at the studies that conclude that tourism activities have a positive impact on the ecological footprint; Katırcıoğlu et al. (2018), the relationship between tourism activities and environmental damage was examined for the 10 most visited countries in the period between 1995 and 2014 using the panel data method. According to the results obtained, the relationship between tourism activities and ecological footprint confirms the environmental Kuznets curve. The development of tourism activities in selected countries creates corrective effects on ecological footprint levels. Kongbuamai et al. (2020) examined the relationship between GDP, energy use, tourism, openness, population density and ecological footprint between 1974 and 2016 in their study for Thailand using the ARDL bounds test technique. The results of the research have shown that variables such as energy use, economic development and openness to trade increase the ecological footprint. Otherwise, it was found that the relationship between tourism activities and population density on the ecological footprint was negative. Using data from 38 countries between 1995 and 2018, Khan et al. (2020) researched the impact of energy consumption, economic growth and tourism activities on the ecological footprint in their study where they applied second generation unit root and cross-section dependence analysis. It states that energy consumption causes economic environmental damage in the long term, while tourism improves environmental quality and promotes economic growth. Khoi et al (2021), examined the intercourse between tourism activities and ecological footprint in Singapore between 1978-2016 with the asymmetric NARDL method, state that developments in tourism have a corrective effect on the ecological footprint. Additionally, while there is a positive relationship between GNP and ecological footprint, it has been shown that there is no meaningful intercourse between energy use and ecological footprint. In the research conducted by Nathaniel et al. (2021) for the top 10 countries that attracted the most tourists in 2019, it was observed that there was a negativ intercourse of the tourist arrivals and tourism revenues on ecological footprint. In addition to these results, the relationship between urbanization, natural resource expenses and energy use and ecological footprint was also found to be negative.

On the other hand, when we examine the studies that argue that there is no relationship between the development of tourism activities and environmental damage; Öztürk et al. (2016), examining the environmental hurt of tourism activities using ecological footprint, tested the effective of the Environmental Kuznets Curve (EKC) hypothesis for 144 countries between 1988 and 2008. In the study carried out using the Generalized Method of Moments (GMM), ecological footprint as an indicator of environmental damage and income data from tourism as an economic indicator was used. According to the results of the study, it appears that there is no significant relationship between tourism income and ecological footprint. Han et al. (2022), who analyzed the impact of tourism development on the ecological footprint in Turkey between 1995 and 2017 by establishing two different models, FMOLS and DOLS methods, found no significant relationship between the ecological footprint and tourism.

When the studies reviewed in the literature are evaluated in general, the impact of tourism activities on the ecological footprint may show different results in terms of country groups, the period examined and the estimation methods used. However, the general findings are that tourism activities cause an increase in the ecological footprint. In this regard, the study has a critical role in determining the mutual relations between tourism and the environment and sustainable tourism policies.

THEORETICAL FRAMEWORK

The negative effects of increased economic activities on the environment for a higher level of welfare and higher growth are an inevitable reality. Because in order to produce more, needs more inputs must be used. Therefore, it will cause more natural resource consumption during the production phase. More production means more natural resource consumption, more waste and emissions. By switching from the industrial sector, where energy use is intense, to the production system, where technology use is intense, the share of economic activities that pollute the environment less is increased (Tsurumi et al.; Sarkodie et al., 2019: 130).

It is an undeniable fact that the rapid growth in the tourism sector, which represents an important source of growth due to its contributions to the country's economies, may cause major problems in terms of environmental sustainability (Tsai et al., 2014:14). Because the tourism sector requires large infrastructure investments. Different tourism services such as roads, holiday villages, hotels, marinas, airports and golf courses are investments that require infrastructure. When we look at the negative effects of tourism on the environment, cutting down forests to build resorts and hotels, uncontrolled use of natural resources causes loss of natural habitats and soil erosion. In countries where water resources are limited, the environmental destruction of golf courses and the economic damage they cause must be taken into account. Golf courses pose a great danger in terms of water consumption due to excessive water use. So much so that many chemical fertilizers and pesticides used for lawn care leak underground and cause pollution of water resources and other natural resources. In this sense, the concept of sustainability has gained importance as the awareness that natural resources consumed uncontrollably are scarce has become widespread in societies (Garcia-Falcon ve Medina-Munoz, 1999).

Although the concept of sustainability has basic dimensions consisting of economic, environmental and social components, sustainability is essentially a situation related to the environment. Aranson (1994) emphasized the purpose of sustainable tourism as using limited natural resources correctly and in a planned manner, preserving ecological and economic balance, preserving natural resources and cultural heritage and transferring them to the generations that will come after us. Clarke (1997), Bahaire and White (1999), Cottrell et al. (2004) stated that in order for the sustainable strategy in tourism activities to be successful, not only airline companies, hotels and restaurants, but all actors within the system must fulfill their responsibilities. This awareness has encouraged many researchers to investigate the impact of tourism on environmental pollution. The existence of a positive or negative relationship between tourism activities and environmental degradation is very important for policy makers.

In studies, CO2 emissions have generally been used as an indicator of environmental pollution, representing the carbon footprint. However, this indicator covers a small part of the environmental damage caused by tourism. When evaluated from this point of view, it would be appropriateto use a more comprehensive indicator. Carbon footprint, which expresses the CO2 emissions resulting from our activities, is only one of the components of the ecological footprint. For this reason, it would be more appropriate to analyze the environmental damage of tourism activities using the more comprehensive ecological footprint indicator instead of CO2 emissions. The ecological footprint calculates the rate at which a country consumes its natural resources and how much of its waste (including CO2 emissions) is capable of being regenerated or cleaned by nature.

The ecological footprint is a parameter that measures the impacts of an individual or community on the environment. Although there are many factors affecting the ecological footprint, the most important factors are listed in Figure 1.

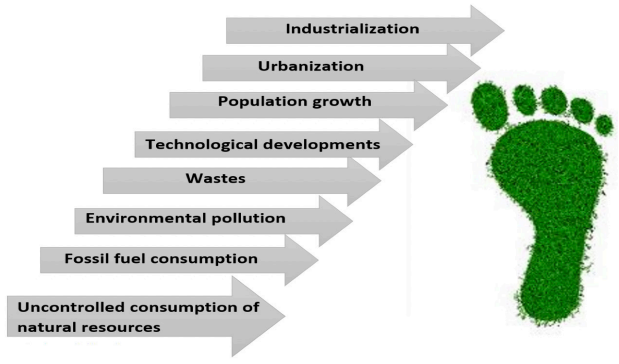

Figure 1: Factors Affecting the Ecological Footprint Area

The increased consumption of natural resources as a result of rapid population growth and increased consumption activities reveals that nature has a resource capacity. The amount of ability to produce renewable natural resources gives us the biological capacity of that region. Today, it is seen that the ecological footprint of many countries exceeds their biological capacity. The value resulting from the production of resources that people will consume and the elimination of waste generated during this

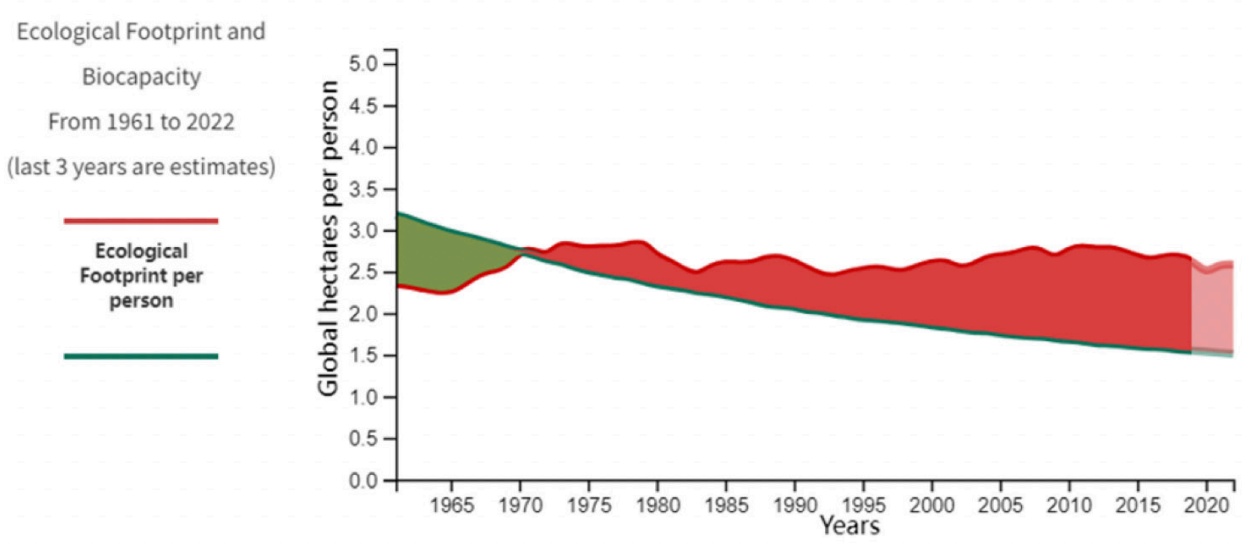

Figure 2: World Ecological Footprint and Biocapacity Trends

Source: National Footprint and Biocapacity Calculations 2023 Edition (Data Year 2019)

production process is called ecological footprint. Ecological footprint measures the amount of natural resources consumed and the rate at which waste is produced. The amount of renewable natural resources we can produce in the same period of time is expressed as biological capacity. If the ecological footprint value is greater than the biological capacity, an ecological deficit will occur (Wackernagel et al., 1999). In order not to create an ecological deficit, the ecological footprint value must be less than the biological capacity. It is clearly seen in Figure 2 that the ecological footprint worldwide has exceeded its biological capacity (GFN-Turkey, 2012: 6).

Countries bordering the Mediterranean are among the world's leading tourism regions with their unique natural beauties, favorable climatic conditions and rich history. According to United Nations data, coastal countries in the Mediterranean region are seen as the most popular tourism destinations (Table 1).

In these countries, which have a coastline on the Mediterranean and are preferred as tourism centers, the tourism revenues are considered as an important resource that contributes to the economic growth of the countries. However, these developments in the tourism industry are among the causes of environmental degradation.

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Table 1: Mediterranean Coastal Countries

MEDITERRANEAN COASTAL COUNTRIES		
Continent of Europe	**Asian Continent**	**African Continent**
France	Türkiye	Egypt
Spain	Israel	Libya
Italy	Palestine	Tunisia
Greece	Lebanon	Algeria
Croatia	Cyprus	Morocco
Monaco	Syria	
Bosnia and Herzegovina		
Montenegro		
Albania		
Malta		
Slovenia		

Although climatic conditions are generally similar in countries bordering the Mediterranean, they have different structures in terms of fertile soils. On one side, there are Western European countries with rich and fertile lands, while on the other side, there are North African

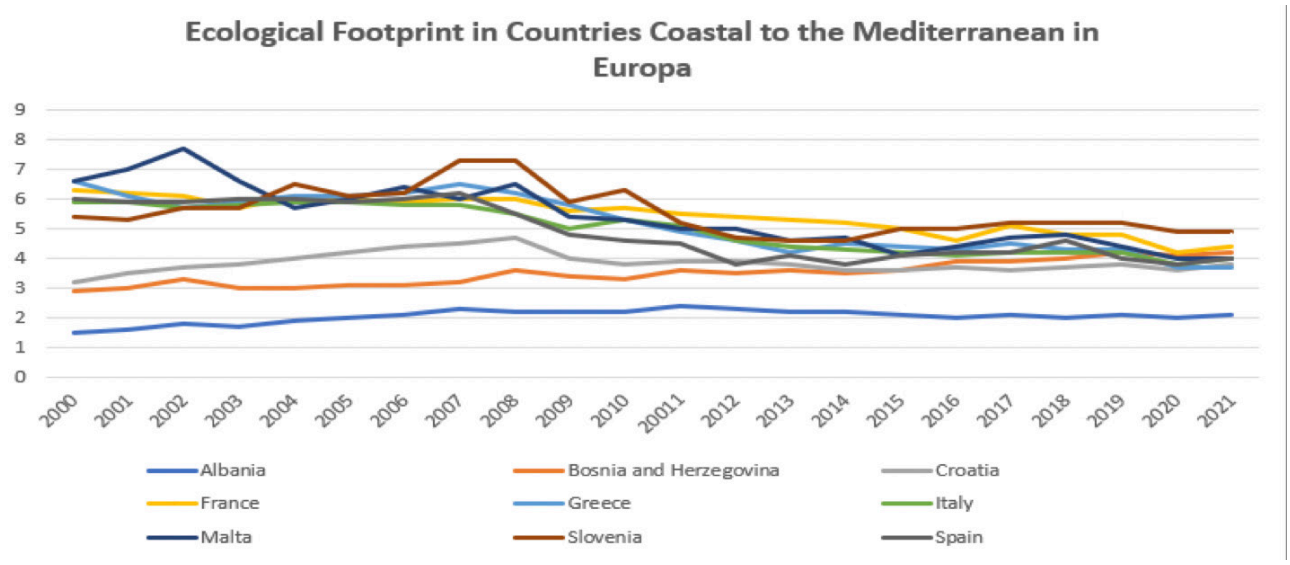

Figure 3: Ecological Footprint Graph of Countries Coastal to the Mediterranean in Asia (Compiled from GFN)

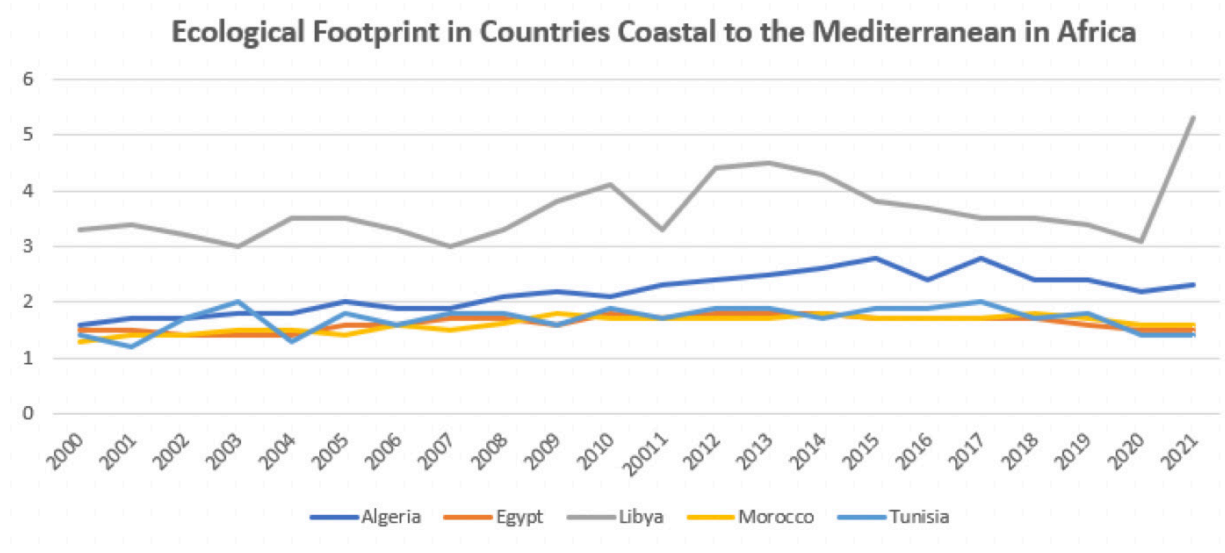

Figure 4: Ecological Footprint Graph of Countries Coastal to the Mediterranean in Africa (Compiled from GFN)

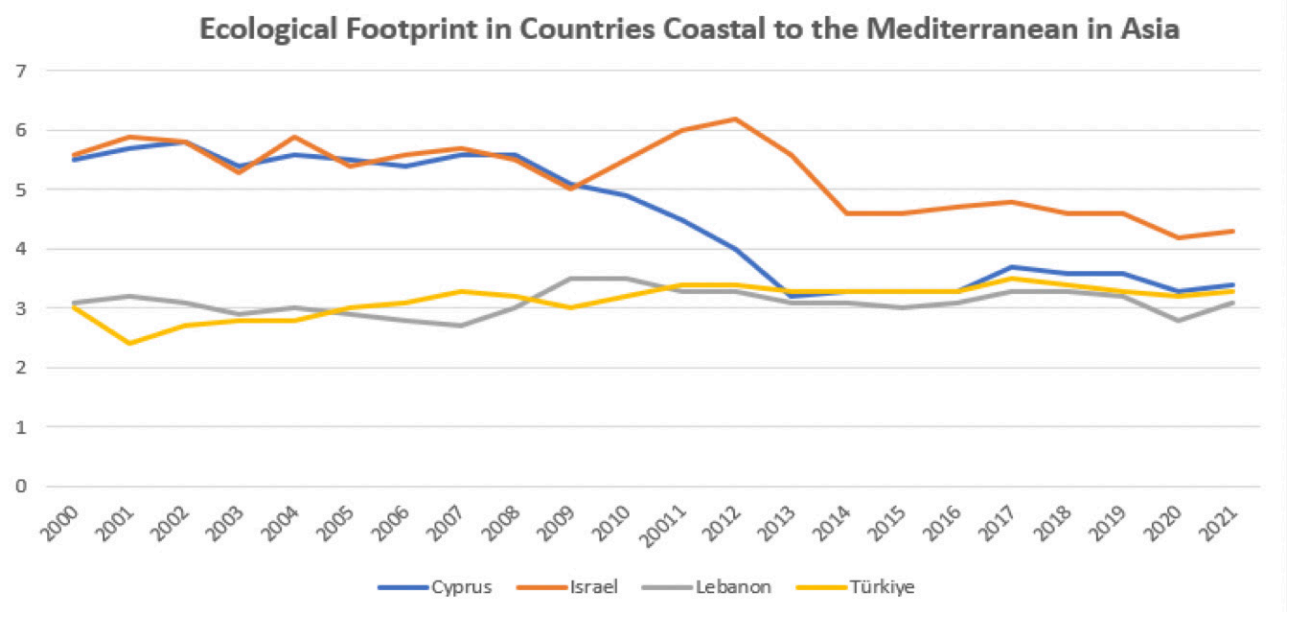

Figure 5: Ecological Footprint Graph of Countries Coastal to the Mediterranean in Asia (Compiled from GFN)

countries with arid lands and relative poverty. On the other hand, these countries bordering the Mediterranean have different structures in terms of income level and consumption amount. While the rapidly increasing consumption amount is important in the countries in the north of the Mediterranean, population growth is also noteworthy in the countries in the south. These rapid increases in both factors cause negative effects on the ecological footprint. Figure 3, Figure 4 and Figure 5 shows the ecological footprint graphs of countries bordering the Mediterranean.

RESEARCH METHODOLOGY

The method that allows testing complex models from time series and cross-sectional data is called panel data analysis (Greene, 2003: 612). Panel data allows the creation of more complex hypotheses and broader modeling compared to one-dimensional data such as cross-sections or time series. For this reason, the number of econometric applications based on panel data has been increasing in recent years.

Econometric Method

Among the analysis methods based on panel data, dynamic panel data analysis is one of the most preferred methods. This study will use panel data analysis and accordingly fixed effects and random effects models. Widely used in dynamic panel data analysis is the Generalized Method of Moments (GMM) developed by Arellano and Bond (1991). Economic behavior in a period is under the influence of behavior in previous periods. Therefore, in the analysis of economic relations, the lagged values of the variables should also be included in the model as explanatory variables. The difference between dynamic panel data models and static panel data models is due to the fact that the lagged variable is also included in the model (Tatoğlu, 2013: 65).

The effectiveness and consistency of predictions made with the Generalized Method of Moments (GMM) is based on two basic assumptions. The first of these is that there is no autocorrelation between error terms. Whether there is an autocorrelation problem in a model is determined by looking at the results of AR(1) and AR(2) tests developed by Arellano-Bond (1991). The second assumption is that the instrumental variables included in the model must be appropriate. The Sargan test is performed to test whether the instrument variables are appropriate (Arellano and Bond, 1991: 282; Yıldız, 2020: 108).

Dynamic Generalized Method of Moments (GMM) is a dynamic model created by including the lagged values of the dependent variable into the model as independent variables. According to the method, the fact that the dependent variable is dynamic means that it is affected by its own history. Dynamic models are generally expressed as follows (Çeştepe et al., 2020: 183). In the model, i denotes the cross-sections dimension and t denotes the time dimension (Tatoğlu, 2012: 130).

$$y_{it} = \alpha + \delta y_{i,t-1} + \beta x_{i,t} + u_{i,t} + \varepsilon_{i,t} \quad (1)$$

In the model numbered (1), for i= 1, 2, ..., N and t=1, 2, …, T; which refers y_{it} the dependent variable, a the constant value, $y_{i,t-1}$ the lagged value of the dependent variable, $x_{i,t}$ the independent variables, β the coefficients, $u_{i,t}$ the errors between the cross-sections and $\varepsilon_{i,t}$ the errors within the cross-sections.

Fixed effects model; It is a linear regression model in which the constant term varies from unit to unit. The constant term takes varying values for each cross-section unit. In other words, differences between units are expressed by differences in the constant term. Additionally, in these models, it is assumed that the independent variables have no connection with the error term. However, there is a relationship between unit effect and independent variables. The fixed effects model can be generally represented as follows:

$$y_{it} = \alpha_i + \beta x_{i,t} + u_{i,t} \quad (2)$$

In model (2), for i= 1, 2, ..., N and t=1, 2, …, T; which shows y_{it} the dependent variable, a_i the i. constant value, $x_{i,t}$ the independent variables, β the coefficients and $u_{i,t}$ the error term of the model (Torres-Reyna, 2007:10).

The random effects model differs from the fixed effects model. In the random effects model, changes that occur cross-section sections or both cross-section and time are included in the model as a component of the error term (Bontempi et al., 2012).

$$y_{it} = \alpha + \beta x_{i,t} + u_{i,t} + \varepsilon_{i,t} \quad (3)$$

In model (3), for i=1, 2, ..., N and t=1, 2, …, T; which represents y_{it} the dependent variable, a the constant value, $x_{i,t}$ the independent variables, β the coefficients, $u_{i,t}$ the errors between the cross-sections and $\varepsilon_{i,t}$ the errors within the cross-sections. The most important difference of model (1) compared to models (2) and (3) is that the lagged values of the dependent variable are included in the model and therefore the dynamic effects of time are taken into account (Tunay, 2014:9-10).

Dataset and Model

Countries bordering the Mediterranean are among the regions in high demand in terms of both touristic investments and international tourism. The Mediterranean Basin accounts for 32% of world tourism. For this reason, the region in which we will investigate the environmental damage of tourism activities consists of countries bordering the Mediterranean. In this context, the relationship between tourism activities and ecological footprint for 17 countries bordering the Mediterranean was examined using the panel data method by considering annual data covering the period 2001-2021.

The availability of data is important in the selection of countries; some countries with missing data were not included in the study. In analysis; generalized method of moments (GMM), system GMM, fixed effects model and random effects models were used. In the study where ecological footprint was considered as the dependent variable, the tourism variable was considered as the main control variable. Energy consumption, industrialization, urbanization, economic growth and foreign direct investments, which are factors that determine environmental degradation, were also included in the model as control variables (Figure 6).

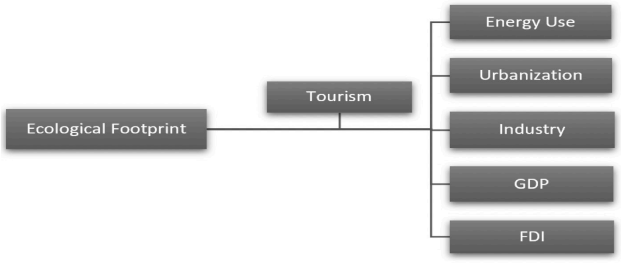

Figure 6: Drivers of Ecological Footprint

The data used in the study were obtained from the World Bank (WDI) and Global Footprint Network (GNF) indicators. The variables used to analyze the impact of tourism activities on the ecological footprint are given in Table 2.

The logarithms of the TA, EC, IND and FDI variables were taken to distribute them within normal limits and to provide more consistent and reliable results. For the variables whose logarithm was not taken, normalization was not required because they were calculated proportionally.

Table 2: Data Set and Variables

Symbol	Variable	Source	Period
EF	Ecological Footprint per Person (kha)	GFN	2001-2021
TA	Number of Tourists Arrivals	WDI	2001-2021
EC	Total Energy Consumption	WDI	2001-2021
IND	Industrialization	WDI	2001-2021
URB	Urban Population	WDI	2001-2021
GDP	Economic Growth Rate	WDI	2001-2021
FDI	Foreign Direct Investments	WDI	2001-2021

Source: 1. WDI (World Development Indicators)
2. GFN (Global Footprint Network)

Based on the theoretical and empirical literature examined in accordance with the purpose of the study, the econometric model based on the GMM method can be expressed empirically as follows:

$$EF_{i,t} = \beta_0 + \beta_1 EF_{i,t-1} + \beta_2 LOGTA_{i,t} + \beta_3 LOGEC_{i,t} + \beta_4 LOGIND_{i,t} + \beta_5 URB_{i,t} + \beta_6 GDP_{i,t} + \beta_7 LOGFDI_{i,t} + \varepsilon_{i,t} \quad (4)$$

In the model (4), each β parameter shows the coefficients of the relevant estimated variables. The parameter β_0 refers to the constant value, and the parameter ε_{it} refers to the error term that shows the difference between the actual value and the predicted value for the model.

$EF_{i,t}$: It represents the ecological footprint. Reasons such as rapid population growth, developing technology, increased urbanization rate, increased production and consumption activities cause environmental problems such as unconscious consumption of natural resources, increase in waste, destruction of agricultural lands, forests and living species.

$TA_{i,t}$: It shows tourism activities. The tourism sector has some externalities such as air pollution, water pollution, noise pollution, visual pollution and soil pollution. Especially the air conditioning and cooling systems of tourist facilities and fuel emissions resulting from tourism activity pollute the air. Most importantly, the fact that hotels do not have a proper sewage system and wastewater treatment system causes sea pollution. Considering these effects of tourism activities, it is expected that the number of incoming tourists will positively affect the ecological footprint.

$EC_{i,t}$: It gives the total energy consumption. The increase in energy consumption brings with it important environmental problems such as air, water and soil pollution. In theory, energy consumption is expected to positively affect the ecological footprint.

$IND_{i,t}$: It represents the data of industrialization. Industrialization without adequate infrastructure causes the destruction of forests, vegetation and many natural resources through the waste left by factories during the goods processing and production process. It is expected that industrial waste is one of the dominant factors that positively affects the ecological footprint.

$URB_{i,t}$: Urban population was taken as an indicator of urbanization. As the urbanization rate increases, housing demand, energy demand and consumption rate will also increase. In addition, the conversion of fertile lands into residential areas, consumption of natural resources and generation of waste will cause environmental problems. Theoretically, urbanization is expected to increase the ecological footprint.

$FDI_{i,t}$: When we examine the literature on the relationship between foreign direct investments and the environment, a long-term relationship was observed in underdeveloped and developing countries, while no significant relationship was found in developed countries.

Empirical Findings

Table 3 provides the descriptive statistics of the variables we used in the empirical study. All mean values of variables are found to be positive.

According to the descriptive statistical values, it is seen that the difference between the minimum and maximum values is low and the standard errors of the variables are also low. There are 374 observations in total for all variables. For this reason, the data set was evaluated as a balanced panel data set.

In order to apply parametric tests, normality distribution must be ensured. In this context, kurtosis and skewness coefficients were examined in order to determine the suitability of the variables for normal distribution. Hair et al. (2010) and Byrne (2010) stated that data is considered to be normal if skewness is between -2 to +2 and kurtosis is between -7 to +7. Since the skewness and kurtosis values in Table 4 remain between these critical values, it can be said that the variables are normally distributed. For this reason, it was decided to apply parametric tests in the study.

High correlation between independent variables causes some calculation errors, inconsistent results and incorrect coefficient values. For this reason, a correlation test was applied to see the relationship of the variables with each other. Table 4 shows the correlation test results.

The results of the correlation table show that there is a high correlation between some variables. The fact that the correlation coefficient between two variables is close to 1 suggests that there may be multicollinearity. While the correlation coefficient between the LOGIND variable and the LOGTA variable was found to be 0.853, the correlation of the LOGFDI variable with the LOGTA and LOGIND variables was determined as 0.559 and 0.601, respectively. Since the correlation between the LOGIND variable and the LOGTA variable was high, it was evaluated that there was a risk of multicollinearity problem in our model.

The problem of multicollinearity occurs when the correlation between variables is high. This will cause coefficient estimates to be biased and inconsistent. For this reason, whether there was a multicollinearity problem between the variables in the model used in this study was tested with Variance Increase Factor analysis.

In general, when the VIF value is above 10 (VIF values ≥ 10), the existence of multicollinearity between variables is accepted (Topal et al., 2010: 56). In the multicollinearity

Table 3: Descriptive statistics -means, standard deviation, skewness and kurtosis

	EF	LOGTA	LOGEC	LOGIND	URB	GDP	LOGFDI
Mean	3.76	15.54	9.977	23.694	67.133	2.194	21.87
Median	3.7	15.483	10.06	23.347	67.498	2.44	21.704
Maximum	7.7	18.325	12.847	27.066	94.81	18.912	25.286
Minimum	1.2	11.842	7.368	20.274	41.741	-19.748	14.509
Std. dev.	1.58	1.561	0.691	1.906	15.617	4.069	1.724
Skewness	0.12	0.008	-0.206	0.285	0.112	-0.715	-0.327
Kurtosis	1.87	2.23	3.225	1.862	1.958	6.889	3.839
Obs.	374	374	374	374	374	374	374

Source: Calculated by the author using Stata 18 program

Table 4: Correlation Matrix

Variables	ECOPC	LOGTA	LOGIND	LOGFDI	GDP	LOGEC	URB
ECOPC	1,000						
LOGTA	0.204	1,000					
LOGIND	0.273	0.853	1,000				
LOGFDI	0.281	0.559	0.601	1,000			
GDP	-0.113	-0.167	-0.212	-0.133	1,000		
LOGEC	0.853	0.198	0.228	0.322	-0.129	1,000	
URB	0.502	0.207	0.203	0.420	-0.216	0.499	1,000

Source: Calculated by the author using Stata 18 program

test results shown in Table 5, the fact that VIF values are lower than 5 shows that there is no multicollinearity problem among the variables that would affect the model.

After it is determined that there is no multicollinearity problem in the model, parametric tests can be started. Table 6 includes the results of the OneStep System GMM, OneStep Difference GMM, Fixed Effects and Random Effects analyzes determined for this study.

In dynamic panel data models, the AR(1) value is statistically significant, that is, first-order autocorrelation; It is important that the second-order autocorrelation AR(2) value is not meaningless, in other words, it is not a first-order autocorrelation (Baum and Schaffer, 2013). It is seen that there is no autocorrelation in the Arellano-Bond One Step Difference GMM and System GMM test analyzes performed for the model (Table 6). AR(1) values are statistically significant and negative at the 5 percent level for both analyses. AR(2) values give insignificant results as expected. These results show that there is no autocorrelation in the models, GMM estimates are consistent and therefore the coefficients are interpretable.

The Wald test gives the result that all explanatory variables together explain the dependent variable significantly. According to the GMM estimation results, the lagged value of the ecological footprint is significant

Table 5: Results of Variance Inflation Factor (VIF) Test

	VIF	1/VIF
LOGIND	4,116	0.243
LOGTA	3,724	0.269
LOGFDI	1,864	0.537
URB	1,543	0.648
LOGEC	1,371	0.73
GDP	1,089	0.919
Mean VIF	2,284	.

Source: Calculated by the author using Stata 18 program

at the 1% level. The Sargan test, which was performed to determine the overvaluation problem in the model, was also found to be at the desired values. It was determined that there was no overvaluation in the instrumental variables used in the GMM analysis and that the selected instrumental variables were appropriate to use in the model. The lagged value of the dependent variable added to the model in the GMM analysis was found to be significant and positive, as expected, as a result of both the System GMM and Difference GMM analyses. This shows that the determined model is consistent.

A one percent increase in the number of tourist arrivals (LOGTA) rising the ecological footprint (EF) by 0.133 units according to the System GMM analysis result, and by 0.226 units according to the Fixed Effects estimator results. It was concluded that the number of tourist arrivals affects the ecological footprint significantly and positively. On the other hand, Difference GMM and Random Effects estimator show that the number of incoming tourists (LOGTA) has a negative impact on the ecological footprint (EF).

It is seen that the largest share of energy costs in the tourism sector is in heating, lighting and hot water usage in hotels and restaurants. It has a positive and statistically significant effect on energy use (LOGEC) and ecological footprint (EF) in all estimators . According to the results obtained, a one percent increase in energy use will cause an increase of 0.369, 0.286, 0.458 and 1.003 units on the ecological footprint (EF) for the System GMM, Difference GMM, Fixed Effects and Random Effects estimators, respectively.

The industrialization variable (LOGIND) gave significant results only as a result of Fixed Effects and Random Effects estimators. Accordingly, a one percent increase in the industrialization (LOGIND) variable will cause an increase of 0.361 and 0.211 units on the ecological footprint (EF) for the Fixed Effects and Random Effects estimators, respectively.

Table 6: Determinants of Ecological Footprint (2001-2021)

EF (Dependent Variable)	(1)	(2)	(3)	(4)
	System GMM	Difference GMM	Fixed Effects	Random Effects
EF(L1)	0.884*** (0.038)	0.809*** (0.061)	-	-
LOGTA	0.133** (0.051)	-0.007 (0.095)	0.226*** (0.09)	-0.058 (0.074)
LOGIND	-0.078 (0.053)	0.219 (0.143)	0.361*** (0.105)	0.211*** (0.073)
LOGFDI	0.053*** (0.026)	0.055** (0.027)	-0.107*** (0.031)	-0.086*** (0.033)
GDP	0.03*** (0.007)	0.02*** (0.007)	0.013 (0.009)	0.024*** (0.009)
LOGEC	0.369*** (0.101)	0.286** (0.135)	0.458*** (0.12)	1.003*** (0.11)
URB	-0.006*** (0.002)	0.015 (0.014)	-0.053*** (0.016)	0.020*** (0.007)
_cons _	-4.258*** (1,183)	-	-7.035*** (2,218)	-9.833*** (1,461)
Observations	357	340	374	374
year dummy	YES	YES	NO	NO
AR(1)	-8.37 (p =0.000)	-7.79 (p =0.000)		
AR(2)	1.25 (p =0.210)	1.04 (p =0.300)		
Sargan Test	0.058	0.08		
F Test / Wald Test Possible .	0.000	0.000	0.000	0.000
Number of Vehicle Variables	107	102	-	-

*** Significant at 1%
** Significant at 5%
* Significant at 10%
Parentheses indicate standard errors. System GMM and Difference GMM include time dummies.
AR1 (AR2) Arellano–Bond test for 1st (2nd) order autocorrelation

Tourism activities cause population concentration at certain times of the year, usually during the tourism season and in certain tourist destinations. The urbanization (URB) variable was resulted with different coefficients by the estimators. According to the Random Effects estimator, there is a positive intercourse between urbanization (URB) and ecological footprint (EF). A one percent increase in the urbanization (URB) variable will increase the ecological footprint (EF) by 0.020 units. The Fixed Effects estimator did not obtain a significant result, although there was a positive relationship between urbanization (URB) and ecological footprint (EF).

The effect of the economic growth (GDP) on the ecological footprint (EF) was found to be positive and statistically significant in all estimators, except the Fixed Effects estimator. When the analysis results are examined, if the economic growth (GDP) variable increases by one percent, the ecological footprint (EF) variable will cause an increase of 0.030, 0.020 and 0.024 units for the System GMM, Difference GMM and Random Effects estimators, respectively.

A statistically significant effect was found in GMM analyzes between foreign direct investments (LOGFDI) and ecological footprint (EF). This result is compatible with economic theory and expectations. Accordingly, a one percent increase in foreign direct investments (LOGFDI); According to the results of system GMM analysis increasing the ecological footprint (EF) by 0.053 units; According to the Random Effects estimator, it reduces by 0.086 units.

CONCLUSIONS

Today, reasons such as technological advances, improvement in living standards and freedom of travel brought about by globalization have made tourism one of the fastest growing sectors in the world. These developments in the tourism sector have added a new dimension to the international trade economy. Especially in developing countries, tourism constitutes an important source of economic development. Foreign exchange inflows obtained through invisible exports as a result of

tourist activities have become an important source for countries. Thus, the foreign exchange inflow obtained from tourism revenues makes a significant contribution to meeting the balance of payments deficit of the countries. It also supports the economic growth of countries by increasing the employment volume. The contribution of the tourism sector to the national economy is an undeniable fact. When the literature on the impact of tourism activities on economic growth is examined, it is seen that tourism increases economic activities and, accordingly, supports economic growth in the long term. (Belisle and Hoy, 1980; Holzner, 2011). While the aim of investments in the tourism sector was primarily to obtain economic gains, today the concept of sustainable tourism has emerged and the effects of tourism activities on environmental quality have come to the fore. It is a fact that the environmental consequences of the rapidly growing tourism sector cannot be ignored any longer (Gössling et al., 2002:199-200).

The main purpose of this study is to examine the relationship between tourism activities and ecological footprint in countries bordering the Mediterranean, where the tourism sector is intense. In the study where Dynamic Generalized Method of Moments (GMM), system GMM, fixed effects model and random effects models were used, the data range was determined as 2001-2021. In this context, the ecological footprint indicator was used to represent environmental degradation. In the study, where the number of incoming tourists was considered as the main control variable, an ecological footprint model was created by including control variables such as industrialization, urbanization, foreign direct investments, economic growth and energy consumption, which are among the factors that are related to tourism activities and trigger the ecological footprint, into the model. When evaluated from this perspective, the study aims to contribute to the few empirical literature on this subject and to provide a source for studies in this field by investigating the environmental damage of tourism in countries bordering the Mediterranean, where tourism activities are intense, with the ecological footprint indicator, which includes many factors such as carbon footprint. aims. The findings obtained are limited by the econometric method used, the data set used in the analysis and the period covered by the analysis.

According to the System GMM estimator, it was concluded that the number of incoming tourists, energy consumption, foreign direct investments, economic growth and urbanization positively affected the ecological footprint. According to another estimator Fark GMM, it has been observed that energy consumption, foreign direct investments and economic growth increase the ecological footprint. According to the Fixed Effects estimator, the effect of all variables except economic growth on the ecological footprint was found to be positive. In addition, according to the Random Effects estimator, energy consumption, foreign direct investments, economic growth and urbanization positively affect the ecological footprint. The results obtained from the study confirm the views that tourism activities cause environmental degradation.

The results obtained from the study are similar to Bagliani studies in the literature. et al. (2004), Leon et al. (2014), Godil et al. (2020), Younes et al. (2020), Kongbuamai et al. (2020a), Ansari et al. (2021), Alola et al. (2021), Kutlu et al. (2022), Adedoyin et al. (2022) and Guan et al. (2022), that tourism activities cause environmental degradation.

When the studies reviewed in the literature are evaluated in general, although the effect of tourism activities on the ecological footprint may show different results in terms of country groups, the period examined and the estimation methods used, the findings obtained in general lead to an increase in the ecological footprint of tourism activities. In this context, strategies to reduce environmental damage caused by the tourism sector are an inevitable necessity. Countries should develop and evaluate their natural resources within the framework of sustainability. Environmentally friendly tourism projects aiming at sustainable tourism should be prepared. In order for the plans and programs prepared in this direction to be successful, all actors within the system, the public and private sectors, must act together. Everyone, not just airline companies, hotels and restaurants, has to be a part of the solution. Both local governments and non-governmental organizations, as well as the public and other relevant institutions and organizations, must fulfill their duties and responsibilities (Grössling, 2023). On the other hand, individuals who make up the society should be made aware of reducing their ecological footprint and their awareness levels should be increased. In order to increase public awareness, it would be useful to hold meetings and speeches on reducing the ecological footprint in both schools and public institutions. School, factory, fairgrounds etc. Information about environmental pollution should be presented at mass events; People should be made aware of the ecological footprint through various communication tools such as radio, television, internet and magazines. For a sustainable future, more rational choices should be made regarding the resources used and the energy consumed, and ways to live without harming the environment and without exceeding the self-renewal limit of natural resources should be found. Targeting policies to minimize the negative impact of tourism activities on the ecological footprint can only be achieved within the scope of properly planned and sustainable tourism.

REFERENCES

Adedoyin, F.F., Alola, U.V. and Bekun, F.V. (2022). On the nexus between globalization, tourism, economic growth and biocapacity: evidence from top tourism destination. *Environmental Science and Pollution Research* (2022) 29:24995–25005.

Alola, AA, Eluwole, KK, Lasisi, TT and Alola, UV (2021). Perspectives of Globalization oath Tourism As Drivers of Ecology Footprint in Top 10 Destinations Economies. *Environmental Science oath Pollution Research*, 28, 31607-31617.

Ansari, MA and Villanthenkodath, MA (2021). Does Tourism Development Promo ecological Footprint? A Nonlinear ARDL Approach. *Anatolia*.

Anser, M.K., Yousaf , Z., Awan, U., Nassani , AA, Qazi Abro , MM and Zaman, K. (2020). Identifying the Carbon emissions Damage to International Tourism : Turn a Blind Eye. *Sustainability*, 12(5), 1-20.

Aranson, L. (1994). Sustainable Tourism Systems: The Example of Sustainable Rural Tourism in Sweeden. *Journal of Sustainable Tourism*, Vol:2, Issue: 1+2, London.

Arellano, M. and Bond S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economics Studies* , 58 (2), 277-297.

Arı A. (2021). Analysis of Renewable Energy, Tourism, CO2 and GDP Relationship for Turkey. *Journal of Academic Approaches* , C: 12 P: 2 YEAR: 2021, 192-205.

Bagliani, M., et al. (2004). The ecological footprint analysis for the Province of Venice and the relevance of tourism. Transactions on Ecology and the Environment, WIT Press.

Bahaire, T, White, M. E. (1999). The Application of Geographical Information Systems (GIS) in Sustainable Tourism Planning: A Review. *Journal of Sustainable Tourism*, Vol. 7, No. 2, p. 159-174.

Balli, E., Sigeze, C., Manga, M., Birdir, S. and Birdir K. (2019). The relationship between Tourism , CO2 Emissions and Economic Growth : A Case of Mediterranean Countries. *Asia Pacific Journal of Tourism Research*, 24 (3): 219-232.

Banday, U.J., Assawa A. and Kaushik G. (2014). Tourism oath Its Impact on Economics Growth and Environment. *The Asian Economic Review*, September 2014, Volume 56, No.3, 147-162.

Baum, F. C. and Schaffer E. M. (2013). A general approach to testing for autocorrelation. Boston: Boston College.

Belisle, F.J. and D.R. Hoy, (1980). The perceived impact of tourism by residents a case study in Santa Marta, Colombia. *Annals of Tourism Research*, Volume 7, Issue 1, pp:83-101.

Bimonte, S. (2002). Information access, income distribution , and the Environmental Kuznets Curve. *Ecological Economics* , Elsevier , vol. 41(1), pages 145-156, April.

Bontempi, M.E and Golinelli, R., (2012). The effect of neglect the slope parameters' heterogeneity on dynamic models of corporate capital structure. *Quantitative Finance*, Taylor & Francis Journals, vol . 12(11), pages 1733-1751, November

Byrne, B.M. (2010). Structural equation modeling with AMOS: Basic concepts, applications, and programming. New York: Routledge.

Clarke, J. (1997). A Framework of Approaches to Sustainable Tourism. *Journal of Sustainable Tourism*, Vol. 5, No. 3, p. 224-233.

Cottrell, S. Von Der Duim R., Ankersmid P., Kelder L. (2004). Meausuring The Sustainability of Tourism in Manue Antonio and Texel: A Tourist Perspective. *Journal of Sustainable Tourism*, Vol. 12, No. 5, p. 409-431.

Çeken, H. (2008). A Theoretical Examination on the Effect of Tourism on Regional Development. *Afyon Kocatepe University, Faculty of Economics and Administrative Sciences Journal* (CX, S II, 2008)

Çeştepe, H., Yıldırım, E. and Yıldız, H. (2020). The Impact of Health on Economic Growth in Turkey: Panel GMM Evidence from 81 Provincial Levels. *International Journal of Economic and Administrative Studies*, (28), 175-192.

Garcia-Falcon, J. and Medina-Munoz, D. (1999). Sustainable tourism development in island: A case study of Gran Canaria, Business *Strategy and the Environment*, 8, 336-357.

GFN (2023), Global Footprint Network, Access address: https://www.footprintnetwork.org/, (Accessed date: 18 September 2023)

Godfrey, K. B. (1996). Towards Sustainability?, Cited in: Lynn C. Harrison and Winston Husbands, Practicing Responsible Tourism: International Case Studies in Tourism Planning, Policy, and Development, John Wiley & Sons Inc., New York, pp. 58-79.

Godil, DI, Sharif, A., Rafique, S. and Jermsittiparsert , K. (2020). The Asymmetric Effect of Tourism, Financial Development and Globalization on Ecology Footprint in Turkey. *Environmental Science an Pollution Research*, 27, 40109-40120.

Gössling, S. (2000). Sustainable tourism developing in development countries: some aspects of energy-use. *Journal of Sustainable Tourism*, 8 (5), 410-425.

Gössling, S., Hansson, C.B., Horstmeier, O.and Saggel, S. (2002). Ecological Footprint Analysis As A Tool To Assess Tourism Sustainabilty. *Ecological Economics*, pp:199-211.

Greene , W. (2012), Econometric analysis (7th ed.). USA: Pearson education Publication.

Grossman, GM, and Krueger, AB (1993). Environmental impacts of a north American free trade agreement-In : Garber. The US Mexico Free Trade Treaty, 165-177.

Guan, C., Rani, T., Yueqiang, Z., Ajaz, T., & Haseki, M. I. (2022). Impact of tourism industry, globalization, and technology innovation on ecological footprints in G-10 countries. *Economic Research-Ekonomska Istraživanja*, 35(1), 6688-6704.

Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2022). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), Sage, Thousand Oaks, CA.

Han, V., Polat, G. and Coşkun, S. (2022). Türkiye'de Turizm Gelişiminin Çevresel Bozulma Üzerine Etkisinin Değerlendirilmesi. *Fiscaoeconomia*, 6 (2), 345-361.

Holzner M. (2011). Tourism and economic development: The beach disease? *Tourism Management*, Volume 32, Issue 4, Pages 922-933.

Isik, C., Kasimati, E. and Ongan, S. (2017). Analyzing the Causalities between Economic Growth, Financial Development, International Trade, Tourism Expenditure and /on the CO2 Emissions in Greece. Energy Sources, Part B: *Economics, Planning and Politics* , 12 (7): 665-673.

Jebli MB and Hadhri W. (2018). The dynamic causal links between CO2 emissions from transport, real GDP, energy use oath international tourism. *International Journal of Sustainable Development & World Ecology*, 25:6, 568-577,

Jebli, MB, Youssef, SB and Apergis, N. (2019). The dynamic linkage between renewable energy, tourism, CO2 emissions, economic growth, foreign directly investment and trade. *Latin American Economic Review*, 28 (2), 1-19.

Katırcıoğlu, S., Gökmenoğlu, KK and Eren, BM (2018). Testing the Role of Tourism Development in Ecological footprint Quality: Evidence from Top 10 Tourists Destinations. *Environmental Science oath Pollution Research* , 25, 33611-33619.

Khan, I. and Hou, F. (2021). The dynamic links among energy consumption, tourism growth, and the ecological footprint: the role of environmental quality in 38 IEA countries. *Environmental Science and Pollution Research*, 28(5), 5049-5062.

Khoi, NH, Le, NH and Ngoc, BH (2021). The Effect of Tourism Development on the ecological Footprint in Singapore: Evidence from Asymmetric ARDL Method. *Current Issues in Tourism*.

Kongbuamai, N., Bui, Q., Yousaf, H.M.A.U. and Liu, Y. (2020a). The Impact of Tourism and Natural Resources on the Ecological Footprint: A Case Study of ASEAN Countries. *Environmental Science and Pollution Research*, 27(16), 19251-19264.

Kongbuamai, N., Zafar, MW., Zaidi, SAH and Liu, Y. (2020b). Determinants of the ecological Footprint in Thailand : The Influences of Tourism, Trade Openness, and population Density. *Environmental Science oath Pollution Research*, 27(32), 40171-40186.

Kutlu, Ş. Ş. and Kutlu M. (2022). Turizm Faaliyetlerinin Ekolojik Ayak İzi Üzerine Etkisi: Türkiye Örneği. *Maliye Dergisi*, Ocak-Haziran 2022; 182:233-249.

Lee, J. W. and Brahmasrene, T. (2013). Investigating the Influence of Tourism on Economics Growth and Carbon Emissions: Evidence from Panel Analysis of the European Union. *Tourism Management* , 38: 69-76.

Liu, Y., Sadiq, F., Ali, W. and Kumail, T. (2022). Does tourism development, energy consumption, trade openness oath economic growth matters for ecological footprint: Testing the Environmental Kuznets curve oath pollution haven hypothesis for Pakistan. *Energy* 2022, 245, 123208.

Meşter, I., Simut, R., Meşter, L. and Bâc, D. (2023). An Investigation of Tourism, Economic Growth, CO2 Emissions, Trade openness oath Energy Intensity Index Nexus: Evidence for the european Union. *Energies*, 2023, 16, 4308.

Nathaniel, S.P., Barua, S. and Ahmed, Z. (2021). What drives ecological Footprint in Top Ten Tourists Destinations? Evidence from Advanced Panel Techniques. *Environmental Science oath Pollution Research*, 28, 38322-38331.

Paiano, A., Crovella, T. and Lagioia, G. (2020). Managing Sustainable Practices in Cruise Tourism: The Assessment of Carbon Footprint and Waste of Water and Beverage Packaging. *Tourism Management*, 77, 1-12.

Öztürk, İ., Al- Mulali U. and Saboori B. (2016). Investigating the environmental Kuznets curve hypothesis: the role of tourism oath ecological footprint. *Environ science Pollut Res* (2016) 23:1916–1928.

Öztürk, Y. and Yazıcıoğlu, İ. (2002). A Theoretical Study on Alternative Tourism Activities for Developing Countries. *Gazi University Journal of Commerce and Tourism Education Faculty*, Issue: 2, pp.183-195.

Rico, A., Martínez-Blanco, J., Montlleó, M., Rodríguez, G., Tavares, N., Arias, A. and Oliver-Solà, J. (2019). Carbon Footprint of Tourism in Barcelona. *Tourism Management*, 70, 491-504.

Sarkodie, S., A., and Strezov, V. (2019). A review on Environmental Kuznets curve hypothesis using bibliometric and meta- analysis. *Science of the Total Environment*, 128-145.

Scott, D., Hall, C.M. and Gössling, S. (2016). A Review of the IPCC Fifth Assessment and Implications for Tourism Sector Climate Resilience and Decarbonization. *Journal of Sustainable Tourism*, 24(1), 8-30.

Selvanathan, E.A., Jayasinghe, M. and Selvanathan, S. (2020). Dynamic modeling of inter-relationship between tourism, energy consumption, CO2 emissions oath economic growth in South Asia. *International Journal of Tourism Research* 2020, 1-14.

Sun, Q. and Liu, Z. (2020). Impact of Tourism Activities on Water Pollution in the West Lake Basin (Hangzhou, China). *Open Geosciences*, 12(1), 1302-1308.

Tatoğlu, F.Y. (2012). Advanced panel data analysis. Istanbul: Beta Publishing.

Topal, M, Eyduran, E., Yağanoğlu, A. M., Sönmez,A. Y. and Keskin S. (2010). Use of Ridge and Principal Components Regression Analysis Methods in Multiple Linear Connection Case. *Atatürk University Faculty of Agriculture Journal*, 41 (1), 53-57, 2010.

Torres-Reyna, O. (2007). Panel Data Analysis Fixed and Random Effects Using Stata, Data and Statistical Services Lecture Notes, Princeton University.

Tsai KT, Lin TB, Hwang RL and Huang YJ (2014). Carbon dioxide emissions generated by energy consumption of hotels oath homestay facilities in Taiwan. *Tour Manag* 42:13–21.

Tunay, K.B. (2014). Türkiye'de Banka Karlılığının Belirleyicileri: Ölçek Büyüklükleri, Mülkiyet ve Finansal Krizler Temelinde Yeni Bir Analiz. *Bankacılar Dergisi*, Sayı 91, 3-35.

Vita GD, Katircioglu S, Altinay L, Fethi S and Mercan M. (2015). Revisiting the environmental Kuznets curve hypothesis in tourism development context. *Environ science* Pollut Pic. DOI: 10.1007/s11356-015-4861-4.

Wackernagel, M., Lewan, L., and Hansson, C.B. (1999). Evaluing the use of natural capital with the ecological footprint, *Ambio* , 28, 604–612.

World Development Indicators DataBank (2020), Access date: 15 September 2023, Access address: https://databank.worldbank.org/reports.aspx?source=world-developmentindicators.

WWF-Turkey, 2012, Turkey's Ecological Footprint Report (2012), Turkey.

Younes, M., Khalil, A. and Alazab, M. (2020). The impact of the Ecological Footprint on tourist attitudes in choosing the tourist destination. *Journal of the Faculty of Tourism and Hotels University of Sadat City*, Volume 4, Issue 1 - Serial Number 7, Part 1, Pages 48-64.

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