



The impact of tourism on sustainable development in GCC countries

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ABSTRACT

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GCC nations are putting a premium on the tourism sector to diversify their economies. However, there is a lack of knowledge on the effects of tourism on sustainable development in these countries. This research aims to fill this gap by analyzing the short-run and long-run effects of international tourist arrivals on the three sustainable development pillars, i.e., economic, social, and environmental. GCC nations are putting a premium on the tourism sector to diversify their economies. However, in these countries, there is a lack of knowledge on the effects of tourism on sustainable development. The empirical investigation suggests the existence of significant long-run linkages between tourism and all sustainable development pillars. Moreover, the PMG-ARDL model shows mixed results regarding the impacts of tourism on sustainable development. First, tourism accelerates economic sustainability only in the short-run, while it promotes social sustainability, as represented by job creation, in the long-run. Furthermore, tourism deteriorates the ecological footprint in the short-run. However, it contributes to environmental sustainability in the long-run. Finally, the short-run country-specific analysis corroborates the previous results, suggesting that tourism improves economic sustainability but harms environmental sustainability in all countries. However, the effects of tourism on social sustainability reveal some short-term heterogeneity, as it boosts job creation in Saudi Arabia and Kuwait and reduces it in Oman and the United Arab Emirates. The findings of the present study have significant policy implications for achieving sustainable development goals in GCC countries.

Contribution/Originality: The contribution of this research is to conduct a comprehensive empirical analysis of short- and long-run implications of tourism on sustainable development in GCC countries. The study investigates the impacts of international tourist arrivals on the three pillars of sustainable development, namely economic, social, and environmental, using the PMG-ARDL model.

1. INTRODUCTION

Tourism has increasingly become a strategic sector for many countries. This sector can offer a variety of services, including international and national transportation, accommodation, leisure, and shopping. In recent years, there has been a notable increase in the potential for tourism to contribute to economic growth, as suggested by the tourist-driven growth hypothesis (Dwyer, Forsyth, & Spurr, 2004; Ren, Can, Paramati, Fang, & Wu, 2019). Indeed, tourism contributes to GDP growth, plays a vital role in employment dynamics, and strengthens the foreign currency position often used to support the balance of payments. According to Dogru, McGinley, and Kim (2020) there are many ways in which the tourism sector supports economic growth. These include raising income, boosting tax revenues, and fostering employment opportunities. In a recent study by León-Gómez, Ruiz-Palomo,

Fernández-Gámez, and García-Revilla (2021) the authors emphasized the significant effects of tourism on various aspects of the economy in Organisation for Economic Co-operation and Development (OECD) countries. They found that tourism directly contributed 4.4% to gross domestic product (GDP), 6.9% to job creation, and 21.5% to service exports. In addition, tourism has emerged as a crucial driver for attaining economic and employment targets in several MENA countries. Indeed, the tourism sector is considered a pillar of sustainable development in Turkey, while in Egypt, Tunisia, and Morocco, tourism represents an essential source of foreign currency inflows. Recently, various Gulf Cooperation Council (GCC) countries have placed strategic emphasis on the tourism sector within their strategic development plans, including the Saudi 2030 Vision, the Qatar 2030 National Vision, and the Oman 2040 Vision. However, although tourism may have positive impacts on sustainable development through economic growth and employment, it can have a detrimental effect on environmental quality. Most tourism activities often require the use of energy derived mostly from fossil fuels (Paramati, Alam, & Chen, 2017). Tourism activities, like transport, accommodation, and catering, increase greenhouse gas emissions, particularly CO₂ emissions. In this regard, Liu, Lan, Chien, Sadiq, and Nawaz (2022) revealed that tourism is responsible for 5% of global CO₂ emissions. Previous studies on the effects of tourism on sustainable development have demonstrated that the expansion of the tourism sector positively affects income and leads to higher employment rates. However, one cannot overlook the detrimental environmental repercussions of tourism (Balsalobre-Lorente, Driha, Shahbaz, & Sinha, 2020; Dogan, Seker, & Bulbul, 2017; Dogru et al., 2020; Gómez López & Barrón Arreola, 2019; Katircioglu, Saqib, Katircioglu, Kilinc, & Gul, 2020; Kreishan, 2011; Prasad & Kulshrestha, 2015; Pulido-Fernández & Cárdenas-García, 2021; Selvanathan, Jayasinghe, & Selvanathan, 2021; Wang & Wang, 2018; Wu, Liu, Hsiao, & Huang, 2016). Significant benefits, regarded as valuable assets, have resulted from the expansion of tourism. Consequently, a growing body of literature has emphasized the effects of tourism, particularly on the economic, social, and environmental dimensions, as well as its overall contribution to sustainable development. Indeed, recent research has concentrated on the various mechanisms by which the expansion of tourism activities influences sustainable development (Brida & Risso, 2009; Danish & Wang, 2018; Dogru et al., 2020; Gómez López & Barrón Arreola, 2019; Kreishan, 2011; Paramati et al., 2017; Prasad & Kulshrestha, 2015; Raza, Sharif, Wong, & Karim, 2017).

This study is part of this research subject and aims to emphasize the significance of the tourism industry in promoting sustainable development in the GCC region from 2000 to 2021. Given the multitude of dimensions associated with sustainable development, addressing the topic is multifaceted and requires a comprehensive approach. To account for this issue, we investigate the impact of tourism on the three essential pillars of sustainable development: economic, social, and environmental. The present study presents two main novelties. First, this research is a pioneering attempt to empirically assess the impact of tourism on sustainable development in GCC nations. For many reasons, choosing GCC countries is important. Sustainable development and its connection with economic growth have garnered significant attention for several decades. However, GCC countries have not received much attention. Indeed, the tourism sector has emerged as a significant component in the strategic development plans of GCC countries, including the Bahrain 2030 Vision, Saudi 2030 Vision, Qatar 2030 National Vision, and Oman 2040 Vision (Saleh, Bassil, & Safari, 2022).

In addition, GCC countries have actively pursued economic diversification by promoting investment in non-oil industries. The GCC countries are focusing on the tourism sector as a key industry to diversify their economies and address their unemployment challenges. In addition, they formulated tourism industry strategies within the framework of their strategic plans. These plans aim to encourage economic diversification, reduce dependence on natural resources, and reduce the susceptibility of revenue to fluctuations in oil prices. To stimulate the tourism industry, most GCC countries have initiated substantial infrastructure development and key initiatives dedicated to developing the tourism industry. These initiatives include the creation and expansion of airports, as well as the establishment of smart cities, such as Neom in Saudi Arabia. Furthermore, in order to improve the tourist experience and attract international tourists, GCC nations have implemented substantial infrastructure projects

that will enable them to take advantage of major events such as the Dubai Expo 2020, the 2022 edition of the FIFA World Cup in Qatar, and the Riyadh Expo 2030. All the reforms initiated over the past years have aimed to boost tourism and make it a strategic economic sector. These initiatives raise the important question of whether these tourism development strategies have contributed to achieving sustainable development goals in the GCC region. The second novelty of the study lies in its examination of the impacts of tourism on individual pillars rather than relying on an aggregate measure like the adjusted net savings. In this regard, we propose to conduct an empirical analysis of the potential impact of tourism on the three pillars of sustainable development: economic, social, and environmental. This is important for many reasons. On the one hand, the impact of tourism on the different pillars may be different; for example, it may be positive on economic sustainability and negative on environmental sustainability. Using an aggregate sustainable development measure does not allow accounting for these effects. On the other hand, taking into account the various sustainable development pillars is vital since it allows for the development of recommendations adapted to each pillar and accelerates the accomplishment of SDGs in GCC nations.

The rest of the research is organized as follows. Section 2 discusses the literature on the impact of tourism on the three dimensions of sustainable development (economic, social, and environmental). Section 3 presents the econometric methodology and data. In Section 4, we present the empirical findings, while Section 5 concludes and provides policy implications.

2. THE PREVIOUS LITERATURE

2.1. Tourism and Economic Sustainability

Researchers have conducted substantial studies to investigate the connections between tourism and growth, specifically by examining the concept that tourism drives economic growth. [Brida and Risso \(2009\)](#) examined the association between tourism and growth in Chile. Their findings demonstrated that tourism serves as the main engine of economic expansion. Using the same cointegration approach, [Belloumi \(2010\)](#) confirmed the long-run consequences of tourism on GDP in Tunisia. Furthermore, [Adnan Hye and Ali Khan \(2013\)](#) considered the correlation between tourism revenues and economic growth in Pakistan from 1971 to 2008. Their findings confirmed a substantial and long-run linkage between both variables. By focusing on 42 African countries between 1995 and 2004, [Fayissa, Nsiah, and Tadasse \(2008\)](#) concluded that revenues from the tourism industry boost economic growth in SSA countries. [Kreishan \(2011\)](#) studied the implications of tourism revenues on GDP growth in Jordan during the 1970-2009 period. The findings showed a positive long-term association between tourism and GDP. Furthermore, the causality analysis revealed a unidirectional causal linkage between tourism and GDP. [Wu et al. \(2016\)](#) examined the correlation between tourism and GDP in Asia and Australia. Researchers confirmed a bidirectional, nonlinear, time-varying, and country-specific causal link between GDP and tourism. [Lin, Yang, and Li \(2019\)](#) examined the impact of foreign tourists on the expansion of the economies of several Chinese regions. They showed that from 1978 to 2013, tourism increased in 10 out of 29 areas. [Wu, Wu, Ye, Wu, and Pan \(2022\)](#) also analyzed the case of China using the quantile-on-quantile regression. The results show that tourism has positive effects on GDP in most quantiles and regions. Finally, [El Menyari \(2021\)](#) analyzed the repercussions of tourism on GDP in Morocco between 1983 and 2018. The findings show that tourist arrivals positively affect GDP in the long-run. The existing literature supports the formulation of the following hypothesis:

H₁: Tourism has a positive impact on economic sustainability in GCC countries.

2.2. Tourism and Social Sustainability

Several studies have concentrated on the impacts of tourism on additional aspects of sustainable development, specifically social development and jobs. The association between tourism and job creation was investigated by [Pavlič, Tolić, and Svilokos \(2013\)](#) who used data from 2000 to 2012 for Croatia. The findings show a persistent connection between the variables and the beneficial implications of tourism for employment. [Prasad and](#)

Kulshrestha (2015) examined the contribution of tourism to promoting job creation in India using data from national accounts. Research demonstrates that the spending of foreign tourists both directly and indirectly stimulates job creation. Using a panel data technique, Condratov (2017) found that tourism contributed to reducing unemployment in different Romanian regions over the 1990–2015 period. The response of employment to tourism in Mexico was investigated by Gómez López and Barrón Arreola (2019). Overall, the authors concluded that tourist inflows positively affect job creation. Manzoor, Wei, Asif, Haq, and Rehman (2019) estimated the effects of tourism on employment and GDP in Pakistan between 1990 and 2015. The authors highlighted the favorable and substantial impact of tourism on both GDP and job creation. Moreover, Dogru et al. (2020) empirically studied the connection between hotel investment and employment in the United States. The authors show that investments in hotels positively affect employment, which benefits the broader economy and the tourism sector, particularly hospitality and leisure. The results also suggest that as hotel investments rise, the hotel industry witnesses positive effects on employment and job creation, and related economic sectors are also experiencing growth. Based on the discussion above, one could propose the following hypothesis:

H₁: Tourism has a positive impact on social sustainability in GCC countries.

2.3. Tourism and Environmental Sustainability

Several studies have examined the effects of tourism on environmental sustainability. For instance, Tovar and Lockwood (2008) employed a qualitative analysis to check the association between tourism and the environment in Australia. The authors concluded that tourism considerably exacerbates environmental deterioration. Moreover, Raza et al. (2017) used the wavelet method and revealed that tourism contributed to ecological deterioration in the U.S. Furthermore, Paramati et al. (2017) noticed that the influence of tourism on CO₂ emissions lessens in advanced economies. Furthermore, Dogru et al. (2020) and Wang and Wang (2018) proved that tourism has negative consequences for the environment in OECD countries. These outcomes corroborate those of Balsalobre-Lorente et al. (2020). The study findings provide empirical support for the negative ecological consequences of tourism. Additionally, Selvanathan et al. (2021) conducted an empirical study in South Asia from 1990 to 2014 that looked at the dynamic interaction between energy use, CO₂ emissions, tourism, and GDP. The findings demonstrated that tourism boosts GDP over the long run, but it also increases emissions of carbon dioxide. In addition, Katircioglu et al. (2020) confirmed the role of the tourist industry in contributing to the spread of hazardous emissions in Cyprus. Using the ARDL model and the wavelet approach, Villanthenkodath, Mahalik, and Arafath (2022) checked the contribution of tourism to environmental deterioration in India. In a recent study, Asif, Fatima, and Murshed (2023) highlighted the effects of international tourism on CO₂ emissions in the ten largest countries between 1995 and 2018. A small number of studies, including the one by Danish and Wang (2018) have shown that tourism may reduce environmental damage. To evaluate the environmental consequences of tourism, we will test the following hypothesis:

H₂: Tourism has a positive impact on environmental sustainability in GCC countries.

3. THE EMPIRICAL DESIGN

3.1. Data and Empirical Specification

The study investigates the impact of tourism on sustainable development in six GCC countries between 2000 and 2021. More specifically, the analysis considers the three pillars of sustainable development. Tourism is measured using international tourist arrivals (overnight visitors) obtained from the World Tourism Organization. Additionally, we measure economic sustainability through economic growth, social sustainability through employment, and finally, the ecological footprint is used as a proxy for environmental sustainability.

To analyze the impacts of tourism on the three pillars of sustainable development, we employ the following econometric specifications:

$$\text{Model 1: } ECO = \beta_0 + \beta TOUR_t + \gamma' X_t + \varepsilon_t \tag{1}$$

$$\text{Model 2: } SOC = \delta_0 + \delta TOUR_t + \lambda' Y_t + \mu_t \tag{2}$$

$$\text{Model 3: } ENV = \mu_0 + \mu TOUR_t + \varnothing' Z_t + \vartheta_t \tag{3}$$

Where *ECO*, *SOC*, and *ENV* denote economic, social, and environmental sustainability, respectively. *TOUR* represents the tourism variable that will be discussed later. Finally, *X*, *Y*, and *Z* are vectors of control variables:

- **Equation 1** estimates the effects of tourism on economic growth. **Equation 1** describes the key drivers of economic growth dynamics, including tourism and several other control factors. Among these control variables, we chose the population, government expenditure, and gross capital formation. Theoretically, an increase in population reduces the per capita growth rate but may also lead to an improvement in human capital. Government spending has an inconclusive impact on economic expansion. One potential drawback of increased government spending is that it could impede economic development by displacing private investment. Nonetheless, government spending increases can have a favorable impact on economic growth by improving infrastructure. Finally, gross capital formation is considered a booster of economic activity that has a positive impact on economic growth.
- **Equation 2** estimates the effects of tourism on employment dynamics. In addition, the empirical specification also includes other variables considered as potential determinants of job creation. The model includes economic growth measured via GDP growth to assess the employment elasticity of economic growth. Indeed, we expect higher growth rates to lead to an increase in total employment. In addition, a composite index of economic globalization is introduced in **Equation 2**. Economic globalization (trade and foreign capital flows) may have a positive or a negative impact on employment. Finally, capital stock is also considered in the employment specification. Here, the impact of capital stock on employment is also ambiguous. An increase in capital stock may impede job creation if it replaces labor, but it can have a beneficial effect if it complements it.
- **Equation 3** estimates the effects of tourism on environmental quality, approximated by ecological footprint. We introduce GDP per capita as one of the control variables in the specification to capture the impact of economic activity on environmental degradation and to test the Environmental Kuznets Curve. Furthermore, we include the population as a potential driver of environmental sustainability. Finally, total energy consumption is introduced. Indeed, total energy consumption is considered the most important variable inducing environmental degradation, particularly in GCC countries.

Table 1 reports the definitions and sources of the various variables.

Table 1. Definitions and sources of the data.

Acronym	Definition	Source
TOUR	International tourist arrivals, overnight visitors	WTO
GDP	Gross domestic product	WDI
EMP	Total employment	TED
EF	Ecological footprint	GFN
GOV	Government final consumption expenditure (% of GDP)	WDI
POP	Total population	WDI
GCF	Gross capital formation (% of GDP)	WDI
CAP	Capital stock at constant prices	PWT
KOF	Economic globalization	Dreher (2006) and Gygli, Haelg, Potrafke, and Sturm (2019)
GDPGR	GDP growth (Annual %)	WDI
GDPPC	GDP per capita	WDI
ENC	Total energy consumption (QBTU)	EIA

Note: WTO: World tourism organization; WDI: World development indicators; TED: Conference board total economy database; GFN: Global footprint network; PWT: Penn world table; EIA: U.S. Energy information administration.

3.2. Methodology

In order to estimate the effects of tourism on the three pillars of sustainable development, we will perform the PMG-ARDL model. Under the PMG-ARDL model, Equations 1-3 may be written as follows:

$$\begin{aligned} \Delta \ln ECO_{it} = & \alpha_1 + \vartheta_1 \ln ECO_{it-1} + \beta_{1i} \sum_{i=1}^{p_1} \Delta \ln ECO_{it-i} + \beta_{2i} \sum_{i=1}^{p_2} \Delta \ln GOV_{it-i} + \beta_{3i} \sum_{i=1}^{p_3} \Delta \ln POP_{it-i} \\ & + \beta_{4i} \sum_{i=1}^{p_4} \Delta \ln GCF_{it-i} + \beta_{5i} \sum_{i=1}^{p_5} \Delta \ln TOUR_{it-i} + \gamma_1 \ln GOV_{it-1} + \gamma_2 \ln POP_{it-1} \\ & + \gamma_3 \ln GCF_{it-1} + \gamma_4 \ln TOUR_{it-1} + \varepsilon_{it} \end{aligned} \tag{4}$$

$$\begin{aligned} \Delta \ln SOC_{it} = & \alpha_2 + \vartheta_2 \ln SOC_{it-1} + \varphi_{1i} \sum_{i=1}^{p_1} \Delta \ln SOC_{it-i} + \varphi_{2i} \sum_{i=1}^{p_2} \Delta \ln GDPGR_{it-i} + \varphi_{3i} \sum_{i=1}^{p_3} \Delta \ln KOF_{it-i} \\ & + \varphi_{4i} \sum_{i=1}^{p_4} \Delta \ln CAP_{it-i} + \varphi_{5i} \sum_{i=1}^{p_5} \Delta \ln TOUR_{it-i} + \theta_1 \ln GDPGR_{it-1} + \theta_2 \ln KOF_{it-1} \\ & + \theta_3 \ln CAP_{it-1} + \theta_4 \ln TOUR_{it-1} + \omega_{it} \end{aligned} \tag{5}$$

$$\begin{aligned} \Delta \ln ENV_{it} = & \alpha_3 + \vartheta_3 \ln ENV_{it-1} + \eta_{3i} \sum_{i=1}^{p_1} \Delta \ln ENV_{it-i} + \eta_{2i} \sum_{i=1}^{p_2} \Delta \ln GDPPC_{it-i} + \eta_{3i} \sum_{i=1}^{p_3} \Delta \ln POP_{it-i} \\ & + \eta_{4i} \sum_{i=1}^{p_4} \Delta \ln ENC_{it-i} + \eta_{5i} \sum_{i=1}^{p_5} \Delta \ln TOUR_{it-i} + \lambda_1 \ln GDPPC_{it-1} + \lambda_2 \ln POP_{it-1} \\ & + \lambda_3 \ln ENC_{it-1} + \lambda_4 \ln TOUR_{it-1} + \phi_{it} \end{aligned} \tag{6}$$

Where α_i ($i= 1, \dots, 3$) denote the constant term, ϑ_i ($i= 1, \dots, 3$) represent the first lag of the dependent variable. β_{ki} , φ_{ki} and η_{ki} ($k= 1, \dots, 5$) represent the short-run coefficients of the different explanatory variables explaining economic sustainability (*ECO*), social sustainability (*SOC*), and environmental sustainability (*ENV*). Finally, γ_k , θ_k and λ_k ($k= 1, \dots, 4$) are the long-run coefficients.

4. EMPIRICAL RESULTS

4.1. Cross-Section Dependence

We start the analysis by checking the existence of cross-section dependence (CSD). The existing literature has proposed a wide range of tests. This study employs the Breusch-Pagan LM test and the Bias-corrected scaled LM tests. Table 2 summarizes the findings.

Table 2. CSD test results.

Variables	Bias-corrected scaled LM		Breusch-Pagan LM	
	Test statistics	p-value	Test statistics	p-value
lnTOUR	29.934***	0.000	179.780***	0.000
lnGDP	49.003***	0.000	284.226***	0.000
lnEMP	50.289***	0.000	291.270***	0.000
lnEF	43.049***	0.000	251.615***	0.000
lnGOV	33.286***	0.000	198.138***	0.000
lnPOP	50.143***	0.000	290.467***	0.000
lnGCF	15.380***	0.000	100.064***	0.000
lnCAP	51.539***	0.000	298.157***	0.000
lnKOF	18.193***	0.000	115.469***	0.000
GDPgr	11.592***	0.000	79.317***	0.000
lnGDPPC	13.291***	0.000	88.624***	0.000
lnENC	50.622***	0.000	293.092***	0.000

Note: *** denotes the rejection of the null hypothesis at 1%.

The null hypothesis of no CSD between countries is rejected for all variables under study at the 1% level. This finding strongly confirms the presence of social, financial, and economic interdependence between GCC countries.

Geographical proximity and high coordination among GCC countries may explain such findings. In addition, most GCC countries are resource-abundant. Consequently, these countries encountered the same shocks.

4.2. Unit Root Testing

We implement the CIPS unit root test, given the existence of CSD. The findings are summarized in Table 3. As shown, mixed findings regarding the stationarity of variables are obtained. Indeed, the null hypothesis is accepted for tourism, GDP, employment, ecological footprint, gross capital formation, capital stock, and GDP per capita. However, the same tests show that government expenditure, population, total energy consumption, KOF index, and GDP growth are stationary at levels. When first differentiating the series, the table indicates that all variables become stationary. Therefore, all variables under study are I(0) or I(1). It is worth noting that all dependent variables (lnGDP, lnEMP, and lnEF) are stationary at the first difference, a mandatory prerequisite for implementing the PMG-ARDL model.

Table 3. CIPS panel unit root test results.

Variables	Level		1st. difference	
	Statistics	p-value	Statistics	p-value
lnTOUR	0.011	0.505	-6.293***	0.000
lnGDP	-0.0882	0.189	-2.435***	0.007
lnEMP	-0.646	0.259	-1.495*	0.068
lnEF	0.283	0.611	-7.668***	0.000
lnGOV	-1.789**	0.037	-4.125***	0.000
lnPOP	-1.837**	0.033	-1.790**	0.037
lnGCF	-0.911	0.181	-6.325***	0.000
lnCAP	1.828	0.966	-2.351***	0.009
lnKOF	-1.351*	0.088	-6.649***	0.000
GDPgr	-2.758***	0.003	-7.906***	0.000
lnGDPPC	0.769	0.779	-2.035**	0.021
lnENC	-2.718***	0.003	-7.611***	0.000

Note: ***, **, and * denote the rejection of the null hypothesis at 1, 5, and 10%, respectively.

4.3. Cointegration Analysis

Investigating whether there is a long-run correlation between the variables under examination is essential before assessing the consequences of tourism on sustainable development. To do so, we employ three cointegration tests: the demeaned Kao residual-based panel cointegration test, the demeaned Pedroni panel cointegration test, and the Westerlund ECM panel cointegration test. Although the first two tests are first-generation cointegration tests, they allow accounting for CSD by demeaning the data before conducting them. Table 4 suggests some divergence regarding the presence of cointegration.

Table 4. Cointegration test results.

Tests	Model 1: Economic sustainability		Model 2: Social sustainability		Model 3: Environmental sustainability	
	Statistics	p-value	Statistics	p-value	Statistics	p-value
Demeaned Kao residual-based panel cointegration test						
Modified dickey-fuller t	-0.441	0.329	-0.586	0.278	-1.989**	0.023
Dickey-Fuller t	-0.667	0.252	-1.213	0.112	-1.544*	0.061
Augmented dickey-fuller t	-1.775**	0.037	-1.841**	0.032	-0.849	0.0197
Unadjusted modified dickey-fuller t	-0.429	0.333	0.103	0.458	-3.135***	0.000
Unadjusted dickey-fuller t	-0.664	0.254	-0.822	0.205	-1.997**	0.022
Demeaned Pedroni panel cointegration test						
Modified Phillips-Perron t	2.637***	0.004	3.046***	0.001	1.310*	0.095
Phillips-Perron t	1.992**	0.023	1.929**	0.026	-2.672***	0.003
Augmented dickey-fuller t	2.744***	0.003	1.364*	0.086	-3.176***	0.000
Westerlund ECM-based panel cointegration test						
Variance ratio	1.914**	0.027	3.216***	0.000	-0.797	0.212

Note: ***, **, and * denote the rejection of the null hypothesis at 1, 5, and 10%, respectively.

In terms of economic sustainability, the first test results do not reveal the presence of cointegration. However, the results of the second and third tests do, at the 1% and 5% levels, reveal the existence of cointegration. Consequently, a long-term association exists between GDP, tourism, population, gross capital formation, and government spending. The table shows similar outcomes for social sustainability (Model 2). Indeed, the Pedroni and Westerlund cointegration tests reject the null hypothesis of no cointegration at 1 and 5%. Employment has been found to be interrelated with other variables over the long-run, including GDP growth, capital stock, economic globalization, and tourism. Finally, the table indicates that environmental sustainability (measured by ecological footprint) and the different explanatory variables are cointegrated. The Kao and Pedroni cointegration tests confirm this conclusion but not the Westerlund ECM-based test. To summarize, the analysis suggests the presence of cointegrating relationships between the three sustainability pillars and their corresponding explanatory variables.

4.4. Short- and Long-Run Effects

Assessing the impacts of tourism on the three sustainable development dimensions is the next step in the empirical investigation. Table 5 illustrates the results. The results reveal that tourism is ineffective in terms of long-term impacts on the economy, but in the short-run, a positive and significant coefficient is observed. Indeed, the findings suggest that tourism improves GDP in the short term, but it has no long-run economic effects.

Table 5. PMG-ARDL model estimation results.

Variables	Long-run		Short-run	
	Statistics	p-value	Statistics	p-value
Economic sustainability (Dependent variable: lnGDP)				
lnTOUR	-0.0013	0.872	0.039***	0.000
lnGOV	-0.572***	0.000	-0.043	0.255
lnPOP	0.653***	0.000	-0.297	0.521
lnGCF	0.233**	0.016	-0.028	0.279
ECT	-	-	-0.194*	0.058
Constant	-	-	3.279*	0.056
Social sustainability (Dependent variable: lnEMP)				
lnTOUR	0.160**	0.035	0.012	0.278
GDPGR	0.008**	0.041	0.008	0.914
lnKOF	4.044***	0.000	-0.238	0.273
lnCAP	0.224***	0.005	0.174	0.397
ECT	-	-	-0.032*	0.061
Constant	-	-	-0.529	0.589
Environmental sustainability (Dependent variable: lnEF)				
lnTOUR	-0.109**	0.039	0.064***	0.000
lnGDPPC	0.632***	0.000	0.110	0.697
lnENC	0.090*	0.051	0.034	0.888
lnPOP	1.027***	0.000	1.174*	0.051
ECT	-	-	-0.417***	0.000
Constant	-	-	-1.391***	0.000
Diagnostic test: Pesaran CSD test in residuals				
Economic sustainability	0.897 (0.369)			
Social sustainability	-0.607 (0.543)			
Environmental sustainability	1.694 (0.090)			

Note: ***, **, and * denote the statistical significance at 1, 5 and 10%.

More specifically, when the number of arrivals increases by 1%, there will be a rise in GDP of 0.039% in the short-run. Likewise, the analysis indicates that government expenditure, population, and gross capital formation have significant coefficients only in the long-run. The table also shows that population and gross capital formation

positively affect long-term GDP. We anticipate these findings, given that investment is a crucial catalyst for economic activity, generates wealth, and stimulates growth. The positive implication of population on economic sustainability may be attributable to human capital accumulation, which is important for economic growth. A larger population leads to improved human capital and higher economic growth in the long-run. Finally, government spending has negative effects, as non-productive government expenditure may hinder domestic investments and reduce output, resulting in a decreased GDP (Chu, Hölscher, & McCarthy, 2020). The negative and significant coefficient of the error correction term demonstrates the long-term connection among the variables. Next, we evaluate the impact of tourism on social sustainability, specifically in terms of job creation. The PMG-ARDL model results reveal that the coefficient of tourist arrivals is positive and statistically significant at 5% in the long-run. Furthermore, a 1% rise in tourist arrivals results in a long-term boost in job prospects of 0.160%. Although the short-run coefficient is also positive, it is not significant. The table also shows that GDP growth positively affects employment in GCC countries. The results align with the research conducted by Ben-Salha and Zmami (2021) which demonstrated a positive correlation between employment and growth in GCC nations by estimating the time-varying employment intensity of growth. Economic globalization (KOF) also has a positive effect on employment. Indeed, international trade may increase demand for national products and additional opportunities (Ben-Salha, 2013). Additionally, foreign capital can create new jobs in host countries, such as the GCC. Indeed, GCC countries have enacted several policies and legislation in recent years to enhance the attractiveness of their economies to foreign investors. Finally, the long-term analysis reveals that capital stock has a positive coefficient, which complements labor in GCC nations. A rise in capital stock by 1% induces a rise in employment by 0.224% in the long-term.

Finally, we estimate the repercussions of tourism on the ecological footprint. According to the PMG-ARDL, tourism exhibits a positive coefficient in the short-run and a negative coefficient in the long-run. In other words, tourism arrivals degrade environmental indicators in the short term while improving them in the long run. This may be attributable to the adoption of green tourism and eco-tourism, which may offer a greener alternative to conventional tourism. The implementation of eco-tourism may require significant time and investments. As expected, energy use increases the ecological footprint and deteriorates environmental quality in the long-run. Indeed, GCC nations rely heavily on fossil fuel energy sources, which have negative environmental consequences. Population also exerts pressure on the environment since a higher population may lead to an expansion in urban cities, an increase in energy demand, depletion of natural resources, and degradation in environmental indicators. Following the results of the cointegration tests, the error correction term is found to be negative and statistically significant. Finally, the Pesaran CSD test results in residuals reported at the bottom of Table 5 indicate no evidence of CSD in estimated residuals for the three models (economic, social, and environmental). Therefore, one could confirm the validity of the PMG-ARDL estimates.

4.5. Country-by-Country Short-Run Effects

The present section aims to identify the short-run country-specific impacts of tourism on sustainable development for the different GCC countries. Table 6 reports the findings. Concerning economic sustainability, the table indicates that tourist arrivals have a positive short-run influence on GDP in all countries. Moreover, the highest impact of tourism is found in Saudi Arabia, while Oman has the lowest coefficient. Indeed, a 1% increase in tourist arrivals leads to a rise in GDP of 0.059% in Saudi Arabia and 0.025% in Oman. Unlike economic sustainability, tourism's impact on social sustainability is characterized by some divergence.

Table 6. Short-run country-by-country results.

Variables	Bahrain		Kuwait		Oman		Qatar		Saudi Arabia		United Arab Emirates	
	Statistics	p-value	Statistics	p-value	Statistics	p-value	Statistics	p-value	Statistics	p-value	Statistics	p-value
Economic sustainability (Dependent variable: lnGDP)												
lnTOUR	0.037***	0.000	0.041***	0.000	0.025***	0.000	0.028***	0.000	0.059***	0.000	0.041***	0.000
lnGOV	-0.073***	0.000	-0.062*	0.078	0.082***	0.000	0.004	0.242	-0.018*	0.097	-0.196***	0.000
lnPOP	0.306***	0.000	-0.450	0.803	0.156***	0.007	0.744***	0.000	-2.458	0.271	-0.083*	0.057
lnGCF	0.001***	0.003	0.034**	0.010	-0.027***	0.000	-0.150***	0.000	-0.031*	0.075	0.001	0.725
ECT	-0.033***	0.000	-0.683***	0.003	-0.191***	0.000	-0.080***	0.000	-0.149***	0.000	-0.027***	0.005
Constant	0.557**	0.017	11.471	0.670	3.124**	0.028	1.374**	0.028	2.641	0.130	0.507	0.672
Social sustainability (Dependent variable: lnEMP)												
lnTOUR	0.003	0.794	0.058***	0.000	-0.007***	0.000	0.036	0.119	0.010**	0.047	-0.013***	0.003
GDPGR	-0.002***	0.000	0.001***	0.000	0.0008***	0.000	-0.002*	0.052	0.002***	0.000	0.0001***	0.000
lnKOF	-0.384*	0.050	0.593**	0.027	-0.094***	0.000	-1.036	0.529	-0.122**	0.011	-0.387***	0.001
lnCAP	-0.033	0.856	0.339*	0.087	-0.347***	0.000	1.042**	0.043	-0.223	0.117	0.271*	0.071
ECT	-0.119***	0.000	0.265***	0.000	-0.040***	0.000	-0.094***	0.002	-0.021***	0.000	-0.182***	0.000
Constant	-1.968**	0.021	3.968	0.152	-0.562***	0.000	-1.549	0.551	-0.249*	0.080	-0.182***	0.000
Environmental sustainability (Dependent variable: lnEF)												
lnTOUR	0.079***	0.006	0.063***	0.000	0.043***	0.002	0.027***	0.000	0.060***	0.000	0.113***	0.000
lnGDPPC	1.303	0.767	-0.486***	0.002	-0.573	0.492	0.426***	0.000	0.098	0.481	-0.108	0.411
lnENC	-0.967	0.101	0.746***	0.000	-0.069	0.368	0.100***	0.000	-0.155***	0.008	0.554***	0.001
lnPOP	3.404	0.188	-0.797	0.152	0.309	0.712	1.560***	0.000	2.046	0.626	0.522*	0.082
ECT	-0.336***	0.000	-0.520***	0.000	-0.303***	0.000	-0.683***	0.000	-0.099***	0.001	-0.564***	0.000
Constant	-1.018	0.381	-1.809	0.474	-0.969	0.241	-2.338	0.648	-0.353*	0.096	-1.860	0.501

Note: ***, **, and * denote the statistical significance at 1, 5 and 10%.

Indeed, the coefficient of tourism is positive for Kuwait and Saudi Arabia, negative for Oman and the United Arab Emirates, and not significant for Bahrain and Qatar. The seasonal jobs created during Hajj and Umrah may partially explain these results for Saudi Arabia. The divergence in results between countries regarding the impact of tourism on employment may explain the insignificant short-run coefficient relative to the whole sample, as reported previously in Table 5. Finally, we assess the country-by-country short-run effects of tourism on the ecological footprint. Once again, the findings in Table 6 corroborate those in Table 5. Indeed, we previously revealed that tourist arrivals increase the ecological footprint. According to Table 6, all GCC nations have positive and statistically significant coefficients at the 1% level, indicating that tourism negatively impacts environmental quality. In addition, the table suggests that the United Arab Emirates and Bahrain have the highest coefficients. Indeed, a 1% increase in tourist arrivals causes the environment to deteriorate 0.113% and 0.079% in those countries. On the other hand, Qatar and Oman experienced the least detrimental impacts of tourism. Overall, the country-by-country analysis reveals new evidence and suggests some divergence regarding the short-run consequences of tourism on sustainable development.

5. CONCLUSION AND POLICY RECOMMENDATIONS

This study represents a pioneering attempt to assess the implications of tourism for sustainable development in GCC countries. More specifically, the study examines the effects of tourist arrivals on the economic, social, and environmental pillars of sustainable development between 2000 and 2021. The empirical analysis is based on the estimation of three models: economic sustainability (GDP as a dependent variable), social sustainability (employment as a dependent variable), and environmental sustainability (ecological footprint as a dependent variable) using a wide range of second-generation panel data tests, including the PMG-ARDL model. The following empirical results were obtained: First, the cointegration tests confirm the presence of significant long-run relationships between tourism and the three sustainable development pillars. Second, the PMG-ARDL model produces mixed results regarding tourism's short- and long-term consequences. In fact, the research shows that tourism boosts GDP and speeds up economic sustainability, but only in the short-run. On the contrary, tourism positively affects long-term employment, while no short-term effects are observed. Finally, tourism affects environmental sustainability differently in the short- and long-run. Tourism negatively affects environmental quality in the short-run, while these effects are positive in the long-run. Third, in agreement with the prior results, the country-by-country short-run analysis validates that tourism has a favorable short-run effect on economic sustainability but a negative effect on environmental sustainability for all countries. However, the effects of tourism on social sustainability, as measured by job creation, reveal some heterogeneity. Indeed, the only two countries where tourism boosts job creation in the short-run are Saudi Arabia and Kuwait.

The findings of the present research are important for policy design. First, GCC countries should continue developing the tourism sector since our results reveal positive economic effects only in the short-run. Indeed, the tourism sector in some GCC countries is still in its early stages of development, and more efforts to promote it are mandatory. Creating and carrying out suitable policies and strategies will allow GCC countries to boost the tourism industry, which is a crucial objective for most GCC countries to diversify their economies. Second, the tourism industry has a favorable influence on employment prospects. Therefore, further efforts should be made to reinforce these positive effects. Furthermore, tourist businesses may be offered incentives to encourage them to provide employment opportunities for university graduates, thus reducing the prevalent problem of unemployment for people with higher educational qualifications. Finally, the results show that tourism harms the environment in the short-run for the full sample and all countries. On the contrary, the long-run effects are positive. Consequently, it is crucial to prioritize the development of eco-tourism and implement ecologically sustainable practices in the tourism sector to reduce its dependence on nonrenewable energy resources.

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