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The blue economy effects on EUROMED tourism: forecasting approach

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Abstract

This study examines the factors that influence the blue economy in EUROMED, aiming at promoting economic growth in line with the UN Sustainable Development Goals. EUROMED was chosen because all of its nations have fisheries and marine tourism, which are the two key indicators of the blue economy. Blue economy contributes to sustainable development in the fisheries and marine tourism sectors. A commitment to sustainability has sped up national and regional blue economy policy development. The study uses secondary qualitative data and literature review to analyse the synergies and conflicts between EUROMED blue economy strategies and the UN Sustainable Development Goals. The findings suggest that GDP growth, aqua production, open trade, CO2 emissions, and inflation rate influence the blue economy, and that ecotourism that considers education, society, and the environment may generate sustainable fisheries and marine tourism. Only 21 countries gave the ARDL test between 2000 and 2019. This study analyses synergies and conflicts between EUROMED blue economy strategies and UN Sustainable Development Goals. Location-based contextual development of blue economies that suit all players' requirements is essential to maintain sustainability objectives. Ensure resilience against future environmental and political shocks, preserve the ecological underpinning for vibrant blue economies, and create capacity at all levels to promote effective and fair governance. This study tries to make good use of ocean conservation and aquaculture within the context of the blue economy. This is the first EUROMED blue economy study and contributes to the theoretical and methodological development of blue economy research.

Keywords Blue economy, EUROMED, SDGs, Economic growth, Fisheries, Marine tourism, Ecotourism

JEL Classification O13, O44, Q01, Q22, Q56, R11, R58

Introduction

Nowadays, most economists claim that welfare and prosperity of humanity depend on clean natural resources such as the ocean and maritime economies. Seas and oceans provide as reliable supplies of food, energy, minerals, health, and leisure. In order to avoid endangering global well-being and wealth, the ocean and its resources must be used sustainably. Without the cogent control of all sectors of human activity producing consequences, this sustainable use of oceans and seas cannot be achieved.

The need for globally relevant solutions at the local and regional scale to reverse the deteriorating environmental trends attributable to unsustainable development practices is an immense task [40]. Strategies to address the impediments to sustainable development, such as the mitigation of climate change, adaptation to its impacts, and innovative responses to over-consumption and the negative impacts of economic activities, are crucial [40]. The term blue economy, created at the RIO + 20 conferences in 2012, describes the potential of coastal nations' aquatic resources [11, 32, 34]. The UNDP's 14 SDGs highlight the importance of aquaculture and tourism in

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benefiting the least developed nations [4, 45]. Nonetheless, governments around Europe have come to the realization that their blue economies do not align with the sustainable development goals (SDGs). As a result, they have started speaking with pertinent parties to tackle intricate social concerns while taking advantage of the unexplored potential of fisheries and marine environments [21, 27]. The traditional ocean economy focuses on fishing, offshore oil and gas, marine tourism, and shipping, while the blue economy emphasizes renewable energy [8]. The European Commission defines the blue economy as the sustainable use of oceans, seas, and coastlines [12]. The concept of "blue growth" by the European Commission highlights the potential of the blue economy to contribute to economic growth and create new opportunities for all countries, particularly in Europe, through energy, biotechnology, and aquaculture production. The OECD projects that the global Blue Economy will nearly double in size by 2030, growing at a rate that is faster than the overall economy. The resource-generating source that depends on such expansion is also impacted by the environmental effects and the depletion of natural resources brought on by unsustainable economic activity related to oceans and seas.

In most coasts, the seas are at a critical point in many areas, including overfishing, marine pollution, and coastal erosion. A healthy ocean drives economic growth, provides jobs and food, and prevents global warming. Therefore, this study attempts to address aquaculture, fisheries, and marine tourism in the management of ocean resources. The aim of the study is to determine the short run and long run factors that affect the blue economy in selected European countries. The study of these factors is very important for the efficient use of coastal and marine resources.

Thus the study presents a literature review, an approach section, and the results and commentary section to analyse the interplay between these factors and proposes recommendations aimed at facilitating the transition towards a sustainable and equitable blue economy.

Literature review

This section will be divided into three main subsections; as the first will deal with the theoretical background of the term blue economy. The second part will be deal with the main theory while the third part examines the empirical literature.

Blue economy

The term of blue economy was introduced firstly after the United Nations Rio de Janeiro conference on sustainable development in 2012 [36], but it was not internationally accepted as it was limited only for the use of all resources in oceans and coasts. Marine and coastal tourism are interrelated as both of them are connected to sea and ocean as ports, cruises, guides and other activities [38]. The fisheries and marine tourism sectors are growing rapidly, modifying the ecosystem to attract tourists and potentially harming the environment. Without adequate management, activities such as snorkelling, diving, and fishing can threaten the ecology [35]. Over-tourism, caused by high-value ecotourism and environmental deterioration, can harm tourism and the quality of life for locals and visitors [18]. However, increased tourism can also boost the local economy, particularly in the hotel and souvenir industries.

To sustain fisheries and marine tourism, a blue economy approach aims to balance economic growth with environmental protection, using marine resources and oceans for industries such as aquaculture, marine biotechnology, and offshore renewable energy [5, 7]. Governments have begun protecting their sovereignty, oceans, and marine resources since the UNDP published the law of the sea in 1982 [43].

The blue economy concept stresses the importance of sustainable ocean resource utilization for economic growth, such as fishing, seaport business, and tourism [26, 33]. Researchers have used various techniques to study how the blue economy can foster sustainable economic growth, with findings showing that fisheries can influence economic growth through exports without harming the environment [29]. In addition, the blue economy has contributed significantly to the GDP of East Asia, a region with 40% of the world's population residing near the coasts [8, 14], Somalia et al.). Protecting human health and the environment are also key goals of the blue economy.

The tourism sector is considered as one of the most important sectors that contributes to the economic growth and the economy as a whole. Tourism was investigated as the main tool to drive economic growth in many asian countries as malyasia [38], china [19, 44], bangldash [23, 16, and indonsia [24]. Also the attention to the impact of blue economy on tourism and economic growth in developing countries, [31] examined the impact of blue economy and how it leads to economic development in these countries.

In order to achieve sustainable development in blue economy, [44] proposed some policies such as linking the economic growth with sea and water using science and technology, give more attention to marine resources and maintain it as national startegy, establish a legal way to ensure that and defend sea resources in all means as shown in Fig. 1.

Fig. 1 Major sectors related to the blue economy. Source: [17]

Theoretical literatures

There are many theories that are used to examine the use of natural resources and its management in the economy but the main one is **grounding theory**. This theory stated that the overexploitation of natural resources will affect the ecosystem dynamics and policy analysis [30]. This implies the use of adaptive management systems that does not sufficient knowledge but only the knowledge of the social needs.

Also this management system should be accompanied by flexibility and continuous learning from the surrounding situations [15].

Empirical literature

Studies have shown that the blue economy can contribute to sustainable development goals, depending on factors such as fisheries production, GDP, labour, aquaculture, trade, inflation, and gross capital formation [1]. CO2 emissions, which can negatively impact the ocean and its resources, are a critical factor affecting the blue economy [6, 7, 9, 13, 28].

The possibilities of the blue economy for each nation may differ based on the marine natural resources or coastal region they govern [26]. For instance, countries such as Egypt benefit from marine tourism, while Saudi Arabia and the UAE benefit from sea energy.

Then Blue economy was linked to the economic growth and how marine economy contributes to GDP as [19] found that marine economy increases the Chinese growth rate from 6.46% to 13.8% in 11 years starting from 2000 till 2011. This encourages many economists to study the blue economy and how it contributes to economic growth as [24] examined the impact of blue economy to growth and tourism in indonsia that increase GDP by 7.86%.

Thus the literature review showed the research gap as these previous literatures dealt with the asian and african countries, little studied the european ones. Through the literature review, [2] studied this relationship in 27 european countries by depending on Method of Moments Quintile Regression (MMQR) with fixed variables. This concluded that the blue growth will lead to sustainability of fisheries. Comparing to [30] found that any development in fisheries and marine tourism sector will lead to development in all over the economy in Tanzania and Zanzibar. This was examined by using conducting a survey for 200 participants. Thus the authors summarize some literatures studied that relationship between blue economy and number of tourists in Table 1

EUROMED region has more than one third of its population live beside coasts with 155 million tourists coming to the coasts and enjoying the blue environment out of 360 million tourists to the region (UNEP, 2020). The EUROMED region is one of the most important destinations in the world as it is characterized by [42]:

- Its middle location between all continents of the world
- The huge marine environment that attracts many tourists to it with huge concentration on the coast

According to [41], EUROMED has 5 countries from the top touristic destinations in the world in 2020 as shown in Fig. 2 that were France in the first place then Spain in the second place, Italy is the fifth and turkey is the sixth as reflected in figure three. Europe has a huge area of coasts, seas, and oceans and that adds a great to GDP and its large tourism sector [39]. The authors chose theses countries to widen the gap as no literature was found to study the EUROMED region although it has the seniority in the field of fisheries and maritime tourism.

Therefore the hypotheses of the study will be built to study the relationship between economic growth and the number of tourists as shown in Fig. 3. Thus it will study if

Table 1 Previous literature

Literature	Application	Variables	Model	Results
[2]	27 European countries	Fisheries production, % change in number of tourists, use of energy, economic growth, population	Method of moments quintile regression (MMQR)	Positive
[30]	Tanzania and Zanzibar	Tourists perception towards these two case studies	Cross-sectional survey	Positive
[7]	Asia and pacific island countries 1996–2016	CO2 per capita- gross fixed capital formation as a percentage of GDP- number of cellular phone subscription- trade openness- access to electricity as a percentage of the population	Fixed and random effects	Positive
[46]	Bangladesh			
	Keywords in Google search and individuals perceptions	questionnaire	Positive	

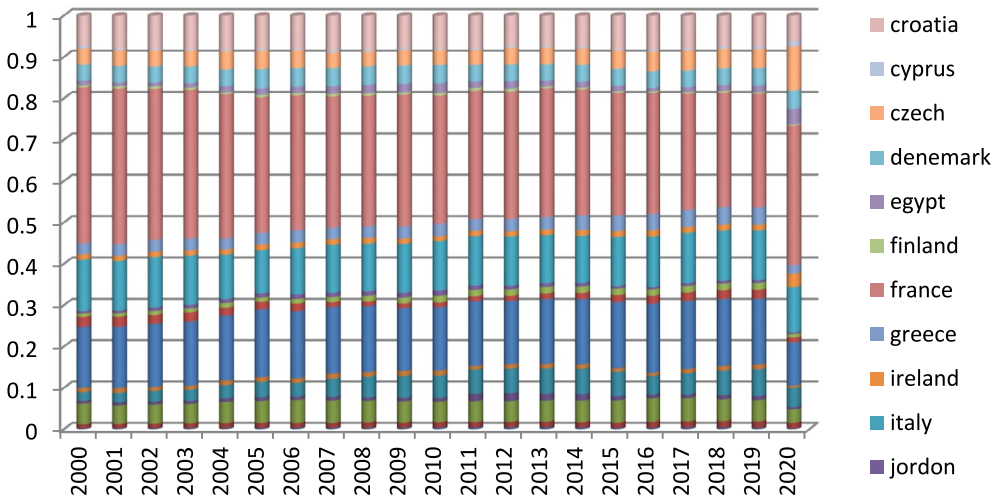

Fig. 2 EUROMED tourists' arrivals by country. Source: done by the researchers depending on UNWTO database

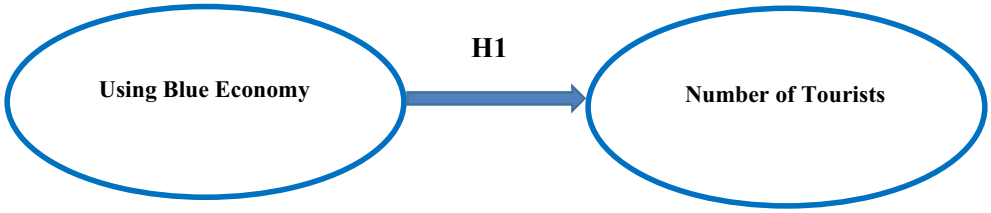

Fig. 3 Explanation of the hypothesis

the use of blue economy resources will lead to increase in number of tourists or not in EUROMED region.

H0: blue economy adaptation will affect the number of tourists in EUROMED
H1: blue economy adaptation will increase the number of tourists in EUROMED
H2: the number of tourists is affected by the change in prices and the changes in gross capital formation

Methods

The data were used depending on the World Bank data, Oxford University, and world tourism organization on an annual base from 2000 to 2020. Although the EUROMED region has 24 countries, the author used 21 countries only due to the unavailability of data. These countries are Egypt, Turkey, Cyprus, Jordon, Tunisia, Algeria, Belgium, Bulgaria, Croatia, Czech, Denmark, Finland, France, Ireland, Greece, Italy, Portugal, Spain, Sweden, the United Kingdom of England, and Morocco. In determining the variables that will be used in the study, Song & Li [37] found that price and income are the main determinants of tourists to any region, thus inflation rate is used to measure the prices in the region, and GDP per capita is used to measure the average income levels. The variables are indicated as shown in Table 2.

The researchers used the Panel time series data analysis through examining the stationary of the data sets, the short run, and long-run equilibrium relationships. Also, all the variables were lagged to reduce any statistical problems as the multicollinearity. Asteriou and Hall [3] used the lagged variables in order to test the impacts of independent variables on the dependent variable in percentage rather than units. In order to test the factors of blue economy in tourism at EUROMED, that paper will use the auto-regression distributed lag model (ARDL). In order to address the heteroscedasticity of time series data, simple time regressions were avoided and dynamic ARDL is reliable [20]. ARDL is used to remove the impact of correlation between variables and residuals in time series data.

Firstly the results were conducted by using dickey fuller (DF), and Phillips-Perron (PP) unit root tests. Then cointegration test and dynamic ARDL model will show the impact on the short run and long run. Then a prediction for the next 10 years using machine learning techniques will be applied.

We tested the stationary of the data by the level and first differences. If the variables were nonstationary at a level, it will have a source unit. Also if these variables were stationary at first difference, the time series will be integrated. Whether the variables were stationary at level or first differences, dynamic ARDL will be applicable [22].

Therefore the functional form of these variables can be expressed in equation one as follows:

$$\begin{aligned} f(\text{TOURIST}) = {} & f(\text{fish}) + f(\text{AQUA}) + f(\text{GDP}) \\ & + f(\text{CO2}) + f(\text{TGCF}) + f(\text{POP}) \\ & + f(\text{TRADE}) + f(\text{INFL}). \end{aligned} \tag{1}$$

This function reflects the sum of all these variables that may affect the application of blue economy in EUROMED countries and will be tested. In other words, the increase in any variable of them—may increase or decrease—will spillover the blue economy. This encourages the researchers to test the following questions:

Table 2 List of variables

Independent variables	Symbol	Construction	Source
GDP per capita	GDP	Gross domestic product divided the total population	World bank
Gross capital formation (a proxy for capital) (in millions)	GCF	Gross capital of fixed assets	World bank
Aquaculture (metric tons)	AQUA	Refers to the output of the aquaculture activities as fish and the use of aqua plants	World bank
CO2 emissions (kt)	CO2	Sum of CO2 emissions from burning and combustion of fossil fuels	World bank
Number of fisheries production (metric tons)	FISH	Production of fisheries per metric ton	World bank
Populations(millions)	POP	Number of total population inside the country	World bank
Dependent variables			
Number of tourists (millions)	TOURIST	Number of tourists visiting the country	World tourism organization
Control variables			
Trade openness (%)	TRADE	The difference between exports and imports as share of GDP	Oxford university
Inflation rate expressed in CPI (%)	INFL	The increase in overall prices levels depending on consumer price index (CPI)	World bank

Table 3 Descriptive data

	AQUA	CO2	FISH	GCF	GDP	INFL	POP	TOURIST	TRADE
Mean	9.8710	11.251	11.992	24.631	9.6085	0.3459	16.505	16.378	4.4184
Median	9.7521	11.033	12.236	24.697	9.9967	0.7508	16.172	16.163	4.4096
Max	14.311	13.209	14.527	27.284	11.355	3.9699	18.443	19.199	5.4806
Min	3.7841	8.7687	6.8885	21.344	6.9680	− 11.736	13.757	13.289	3.4093
SD	2.1848	1.1017	1.8005	1.4391	1.1282	2.0474	1.1576	1.2173	0.3878

Table 4 Correlation results

	FISH	AQUA	CO2	GCF	GDP	INFL	POP	TOURIST	TRADE
FISH	1								-
AQUA	0.6420143	1							
CO2	0.583123	0.603694	1						
GCF	0.630646	0.538845	0.843997	1					
GDP	0.194815	0.25583	0.145240	0.567989	1				
INFL	0.079785	0.081135	0.183883	0.0242355	− 0.234700	1			
POP	0.59828104	0.4958055	0.887597	0.660280	− 0.216868	0.216912	1		
TOURIST	0.3990877	0.6097130	0.535505	0.5829981	0.3414604	0.028725	0.4174718	1	
TRADE	− 0.577355	0.512674	− 0.623316	0.4149657	0.2272272	0.165592	0.751806	0.282388	1

- What are the main variables affecting the blue economy?
- Is there a positive or negative relationship between the number of tourists and the blue economy?
- How blue economy affects the economic growth in EUROMED countries?

Results and discussion

This paper will employ panel data as it will be more detailed with different time series. The reason behind choosing these panel data is the absence or the low probability of the occurrence of multicollinearity. Before conducting the model, the authors conducted a comprehensive data review in order to check the characteristics of the data as shown in Table 3 with positive mean for all variables. The means ranged from 24.63 as the highest mean for GCF and the lowest is for 0.34 for inflation rate. A total of 440 observations were used. Also the highest mean was experienced in GCF that was used as a proxy for the investment and reflects to what extent that these countries invest in tourism. This statistic is considered reasonable as it captures the fluctuations and crisis that those countries have undergone during the decade of study.

Therefore, a correlation test was conducted to measure the direction of the variables and to test the existence of multi collinearity as shown in Table 3. The results show that there is no multicollinearity between variables.

Table 5 Diagnostic tests

Diagnostic test	t-statistic	Conclusion
Jarque–Bera normality	28.69441***	Normality is present
Breush-Pagan LM	1473.725***	No Cross-sectional dependence
Hausement test	18.7868**	Random effect is more efficient

**Significant at 5%

***Significant at 10%

Table 4 shows significant positive relationships between all variables except between trade and CO2 emissions that experienced positive significant relationship and also between GDP per capita and population.

A pooled ordinary least square regression was examined in order to pave the way to examine ARDL on the short and long run. Therefore the observations were pooled together in order to run a simple regression model ignoring the time series and cross-sectional data. This encourages us to test the bias of that model depending on Gauss-Markov assumptions as in Table 4. The results show that the observations of the panel data are normally distributed with serial correlation with no difference in the countries. In analysing the effect of data on the fixed effect or the random effect, Table 4 shows that the observations are significant in the random effect with significance 5% at coefficient 18.7868. This shows that the random effect can explain the

observations that will be helpful in the predications in the long run in Table 5.

As this paper aims to study the effect of blue economy in enhancing the economic growth of the fisheries sector in EUROMED, the analysis began with the pooled OLS regression. OLS pooled all observations together and the results of the regression ignoring the effect of the cross series or time series data in order to ignore the biased linear estimation. The cross data series are expected to be have potential problems and related to each other [10]. In order to solve these problems, Breusch–Pagan LM test is adopted and its results were significant.

Moreover these results show that the variables are normally distributed with no multicollinearity. Then this inspires us to conduct the ARDL model with fixed and random effect on both short run and long run effects.

Table 6 Results of regression

Variable	Independent: OLS	Log(tourist) Short run	Long run	FGLS
FISH	− 0.1531***	0.80405	0.2864	− 0.0796***
AQUA	0.3113***	− 0.20206	2.33545***	0.25044***
GDP	0.1356	− 0.18199	3.07843***	− 0.03234
CO2	− 0.3574***	− 0.77191*	− 8.0338***	− 0.09774
POP	0.4520***	24.9897	3.3512***	0.29269***
GCF	0.3432*	0.38029	− 0.7834	0.343209**
TRADE	0.4395***	0.58419	3.6031***	0.67792***
INFL	0.00630	0.02054	− 0.2405**	− 0.01975

*Significant at 1%

**Significant at 5%

***Significant at 10%

The results of the regression show that there is negative relationship between the GDP per capita, CO2 emissions, and inflation rate from one side and the number of tourists in EUROMED countries in the long run. The relationships between all variables and the number of tourists were significant in the long run. All variables were significant at 1% except inflation rate was at 1% with no significance of gross capital formation and number of fisheries. Also all variables have negative relationships with the number of tourists except aquaculture, GDP per capita, population, and trade openness.

In running FGLS, all variables were significant when all factors are constant except GDP, INFL and CO2. Any increase in AQUA or TRADE or POP or GCF or INFL, will increase the number of tourists. These results come consistent with the results of hausement test- that was examined in Table 4- that shows that these variables are significant in long run more than the short run.

In the short run, *only* the CO2 emissions were negatively significant with the number of tourists. The increase in CO2 emissions by 1% will decrease the number of tourists by 77%. Therefore these variables are insignificant in the short run (Table 6).

EUROMED tourism Forecasting

The paper as it draws from various fields such as economics, tourism, and environmental management to explore the relationship between the blue economy and sustainable tourism. By utilizing both econometric and machine learning approaches, the study provides a comprehensive understanding of the factors influencing the growth of tourism in the EUROMED region.

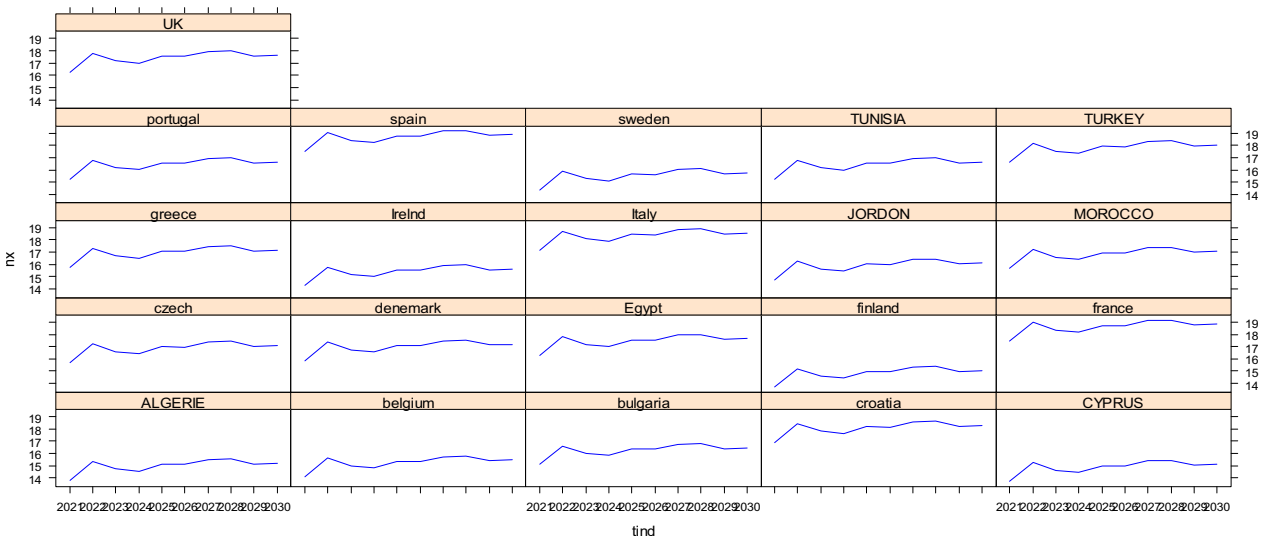

Fig. 4 Expected number of tourists

The study's findings have significant policy and management implications, as they can inform decision-making processes related to sustainable tourism and the blue economy. The regional issue of sustainable tourism in the EUROMED region is scalable and globally applicable, as tourism is a crucial economic sector in many countries worldwide. The authors' forecasting results can inform policymakers and tourism stakeholders on the expected growth of tourism in the region, while also highlighting areas for improvement and investment (Fig. 4).

Additionally, the study acknowledges the impact of external factors such as the COVID-19 pandemic and geopolitical conflicts on tourism demand and emphasizes the need for continued monitoring and adaptation in the face of these challenges. Overall, the research provides valuable insights into the complex relationship between the blue economy and sustainable tourism, offering a foundation for future interdisciplinary research and policy development in this field.

The number of tourists to EUROMED significantly increased. In addition to our forecast, the region experienced a sizable level of visitor inflow. The findings of our analysis pass the long-term significance test as well as the hausement test from 2000 to 2020. Additionally, an average of 8% was used to highlight the increase in tourism that is linked to changes in the blue economy. The CO2 emissions was the only factor that directly affected visitors' arrivals in the region in the short term as the incraese in CO2 emissions will affect the marine economy and therefore negatively affect the blue one. but in the long run, all factors affect the number of tourists except the number of fisheries and gross capital formation.

In addition, the R statistiscal software was used to predict the number of tourists arrivals between 2020 and 2030. It is crucial to note that while predicting is not a precise method, it allows policymakers to be better prepared for years to come to allow policymakers to be better prepared for years to come in order to avoid an increase in tourists.

Conclusion

The blue economy and its sustainability have become increasingly important academic topics and have gained global concern among decision-makers in recent decades. Despite numerous studies evaluating the blue economy from various angles, to the best of our knowledge, no study has empirically looked at the variables that influence the extent of the blue economy in the EUROMED region. In the light of this gap, our study aims to explore the long-term variables that affect the number of tourists, which is a novel contribution to the literature. We use annual data from 21 nations from 2000 to 2020 to achieve this goal.

This study quantifies the effects of ocean governance measures, which are frequently cited as significant drivers of blue economy activity. We find that tourism, CO2 emissions, and inflation are all significantly inversely correlated that was conistent by the results of [25] Additionally, we investigate the factors that affect arrivals of tourists to the two main sectors of the blue economy: fishing and tourism, over the long term.

The findings reveal that the impact of the blue economy on the tourism sector in the EUROMED region, in favour of the number of tourists, is significant in the long run rather than the short run. This encourages us to explore the impact of the blue economy on tourism in the following years, from 2021 to 2030, on the region as a whole and on each country included in the study's population.

Since each of the 21 countries in the study adopts different policies in handling their blue resources and GDP-related activities, the impact on the tourism sector varies between them. However, the most significant impact is on the region as a whole, which will suffer from a decrease in the number of tourists by 2.5%, as shown in Table 7, compared to each country that will experience an increase in the number of tourists.

Our study also finds that GDP, aquaculture, and trade openness positively correlate with the size of the blue economy in the EUROMED region. This necessitates increased spending by governments on information and communication technology (ICT) promotion and physical capital, such as transportation and storage that is consistent to the previous literature results as [2, 44].

Furthermore, our empirical results reveal that increasing aquaculture by 1% will increase the number of tourists to the region by 2.3%, as the region is characterized by a vast area of coasts and marine life in the Mediterranean Sea, Red Sea, and Atlantic Ocean. Additionally, GDP per capita contributes to the increase in the number of tourists by 3%. However, an increase in prices, measured by the change indicated in the consumer price index (CPI) that affects inflation rates, and an increase in CO2 emissions will decrease the number of tourists, which will deteriorate the quality of the marine environment in the region. Finally, the openness of trade will increase the number of tourists that can be achieved by decreasing trade barriers on environmental blue goods and services.

The study's policy implications are significant, including encouraging policymakers to use financial tools that increase the number of tourists as;

Table 7 EUROMED tourism forecast in million (2022–2030)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Growth rate *
EUROMED	18.02022	18.01601	17.67112	18.59468	18.55238	18.44668	17.11679	17.73703	18.43067	17.56791	− 2.5%
Algeria	14.31659	14.53012	14.99638	15.11639	16.06679	16.26365	15.19889	14.57031	15.97475	15.83577	8.94%
Belgium	14.56623	14.77975	15.24601	15.36602	16.31643	16.51328	15.44852	14.81994	16.22439	16.08541	8.86%
Bulgaria	15.57982	15.79335	16.25961	16.37962	17.33002	17.52688	16.46211	15.83354	17.23798	17.099	8.26%
Croatia	17.38888	17.60238	18.06864	18.18865	19.13906	19.33592	18.27115	17.64257	19.04702	18.90804	7.386%
Cyprus	14.21186	14.42538	14.89164	15.01166	15.96206	16.15892	15.09415	14.46558	15.87002	15.73104	9.08
Czech	16.20181	16.41533	16.88159	17.0016	17.95201	18.14886	17.0841	16.45552	17.85997	17.72099	7.9%
Denmark	16.31643	16.52995	16.99621	17.11622	18.06663	18.26349	17.19872	16.57014	17.97459	17.83561	7.9%
Egypt	16.76502	16.97914	17.4454	17.56541	18.51582	18.71268	17.64791	17.01933	18.42378	18.2848	7.69%
Finland	14.17601	14.38953	14.8558	14.97581	15.92621	16.12307	15.0583	14.42973	15.83417	15.69519	9.002%
France	17.93345	18.14698	18.61324	18.73325	19.68365	19.88051	18.81574	18.18717	19.59161	19.45263	7.19%
Greece	16.27962	16.49315	16.95941	17.07942	18.02983	18.22668	17.16192	16.53334	17.93779	17.7988	7.9%
Ireland	14.75148	14.96501	15.43127	15.55128	16.50168	16.69854	15.63378	15.0052	16.40964	16.27066	8.7%
Italy	17.6661	17.88013	18.34639	18.4664	19.41681	19.61366	18.5489	17.92032	19.32477	19.18579	7.2%
Jordon	15.23266	15.44618	15.91245	16.03246	16.98286	17.17972	16.11495	15.48638	16.89082	16.75184	8.4%
Morocco	16.17937	16.39289	16.85915	16.97916	17.92957	18.12642	17.06166	16.43308	17.83753	17.69855	7.896
Portugal	15.76364	15.97717	16.44343	16.56344	17.51385	17.7107	16.64594	16.01736	17.42181	17.28282	8.21%
Spain	17.99287	18.20619	18.67245	18.79246	19.74287	19.93972	18.87496	18.24638	19.65083	19.51184	7.16%
Sweden	14.87152	15.08505	15.55131	15.67132	16.62172	16.81858	15.75382	15.12524	16.52969	16.3907	8.65%
Tunisia	15.75538	15.9689	16.43516	16.55517	17.50558	17.70244	16.63767	16.00909	17.41354	17.27456	8.17%
turkey	17.1371	17.35062	17.81688	17.93689	18.8873	19.08415	18.01939	17.39081	18.79526	18.65627	7.5%
UK	16.77095	16.98447	17.45073	17.57075	18.52115	18.71801	17.65324	17.02466	18.42911	18.29013	7.68%

* The growth rate for each country during the forecasting 10 years

Firstly implementing policies that decrease deterioration in the marine environment and coasts, introducing more investments in the field of blue economy and climate change, using renewable energy to decrease CO2 emissions.
Secondly raising awareness of the importance of the environment as it is one of the main challenges that will affcet the blue economy negatively in the long run.
Thirdly encouraging the government and private sector to organize trips to the blue environment at reasonable prices, especially in times of economic recession,
Fourthly making more governmental efforts to achieve the United Nations 2030 agenda for sustainable development (SDGs), particularly SDG13 and SDG14. Any practice in the marine or ocean should be accompained with sustainable practices as circular economy or ecosystem based policies in order to avoid the overexploitation of these resources
Fifth The increase in the use of technology should be used efficiently not to affect theblue economy negatively
Sixth The use of renewable energy as wind or sun energy in order to decrease CO2 emissions

However, our study has some limitations. Firstly, the lack of data in some countries in the EUROMED region and in certain years limits the research's scope, which ends in 2020. Secondly, the limited number of literature on this topic requires us to study the most significant ones. Thirdly, it would be beneficial to compare these long-run factors between developed and developing countries in dealing with tourism and blue growth.

In conclusion, the study offers valuable insights into the complex relationship between the blue economy and sustainable tourism, highlighting the need for continued interdisciplinary research and policy development in this field. The study's findings have significant policy and management implications, as they can inform decision-making processes related to sustainable tourism and the blue economy, making it highly relevant to the aims and scope of Environmental Development.

Abbreviations

CO2	Carbon dioxide
UN	United Nations organizations
ARDL	Auto regression distributed lag model
OECD	Organization of economic cooperation and development
UNDP	United Nations development program
GDP	Gross domestic product
EUROMED	European Mediterranean countries

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Author contributions
YTH, MMY, AAA contributed to the theoretical foundation, research design, survey execution, data evaluation, and discussion. YTH, MMY, AAA also authored the initial manuscript draft. MMY, and AAA provided critical review and editing of the manuscript. YTH, MMY, AAA have given written consent for the submission of the manuscript in its current form. The final manuscript was read and approved by all authors.

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Availability of data and materials
The datasets generated and/or analysed during the current study are available through the world development indicator- World Bank available n the following link World Bank Open Data | Data.

Declarations

Ethics approval and consent to participate
Not applicable.

Consent for publication
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Competing interests
The authors declare that they have no competing interests.

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