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EXPLORING THE RELATIONSHIP BETWEEN TRAVEL AND TOURISM COMPETITIVENESS INDEX AND UAE TOURISM DEVELOPMENT: AN ARDL CO-INTEGRATION APPROACH

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Abstract

The study investigates the relationship between the Travel and Tourism Competitiveness Index (TTCI) and UAE tourism development. Using the autoregressive distributed lag (ARDL) co-integration technique, the researchers analyze how tourism revenues relative to GDP depend on factors such as government spending on tourism, air transport infrastructure, and port infrastructure. The findings reveal a long-run equilibrium relationship, with positive effects from government spending and air transport infrastructure, but a negative impact from port infrastructure on tourism development. The study recommends continued investment in tourism infrastructure, particularly air transport, and emphasizes the importance of balancing spending and development between air and port transport for optimal tourism growth.

Keywords: *Travel and Tourism Competitiveness Index; UAE tourism development; ARDL; Tourism Revenues; Tourism Infrastructure.*

Introduction

Tourism is a sector that has a significant impact on the quality of life of societies by fostering economic growth, creating jobs, alleviating poverty, advancing development, and respecting diverse cultures. The Tourism and Travel Competitiveness Index report for 2021 states that the tourism and travel sector's substantial role in global economic and social progress makes its revival and long-term expansion crucial. The sector's direct and indirect effects accounted for about 10% of the world's gross domestic product (GDP) in 2019 (Soshkin & Caderwood, 2022).

Moreover, competitiveness is a key factor that drives the tourism sector's development, along with

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improvements in other related sectors. This has enabled some countries to excel in this field by capitalizing on their strengths. On the other hand, it has pushed other countries to lower positions, urging them to overcome their shortcomings and turn them into competitive advantages by implementing well-established policies and frameworks. The development of tourism leads to remarkable achievements and a diversified growth of economic indicators associated with it. (Aguiar-Barbosa, Chim-Miki, & Kozak, 2021; Kim, Liu, & Williams, 2021; Mariani, Bresciani, & Dagnino, 2021). This is especially true when it is aligned with international standards, which are well-known in this sector through the Travel and Tourism Competitiveness Index (TTCI). This index represents a framework that consists of variables that determine the regional and global rankings of countries, issued by the World Economic Forum (WEF,2007), (WEF, 2009), (WEF, 2011), (WEF, 2013), (WEF, 2015), (WEF, 2017), (WEF, 2019). The purpose of this index is to provide a comprehensive strategic tool for measuring the range of factors and policies that enable sustainable development in the travel and tourism sector (Perles-Ribes, 2014). This, in turn, contributes to the development and competitiveness of each country by enhancing their available capabilities, which could potentially influence tourist demand. By providing detailed assessments of Travel and Tourism (T&T) environments for countries worldwide (Montanari and Girald, 2013; Javed and Tuckova, 2019; Montero-Muradas and Oreja-Rodrıguez, 2017; Kovalov et al., 2017), all stakeholders can use the results to cooperate in improving the industry's competitiveness within their national economies. (Dwyer et al., 2014; Ivanov and Webster, 2013; Mazanec and Ring, 2011).

The United Arab Emirates (UAE) has shown remarkable adaptability and growth potential through its diverse and attractive tourist destinations in the region, which continue to draw international travelers (The World Travel & Tourism Council, 2023). The UAE is a federal state, consisting of seven emirates, each ruled by an absolute monarchy: Abu Dhabi, Ajman, Dubai, Ras Al Khaimah, Umm Al Quwain, Fujairah, and Sharjah. Although the country is relatively new as a tourist destination, with only three decades of history, it has quickly flourished with a multitude of notable events, impressive achievements, and especially, rapid infrastructural developments, featuring many tourist attractions and stunning architectural structures, as well as scenic beaches.

The Emirates offer a variety of attractions, such as the world's largest aquarium, a ski resort in the desert, and beautifully designed mosques, adding to its appeal as a desirable destination. Since its establishment, UAE's leadership recognized the importance of tourism as a key economic sector, vital for diversifying the economy away from oil reliance. As a result, within a short period, the country has risen to become one of the world's leading travel destinations, especially popular among European visitors. (Bedjaoui, 2022). Despite changes in the axes structure of the Travel and Tourism Competitiveness Index and its sub-indicators from the period 2007-2013 to the period 2015-2019, the United Arab Emirates ranked first in the regional and Arab lists in terms of both axes and sub-indicators of the index under study. The UAE has maintained its position and achieved excellence due to its high flexibility in accordance with changing international standards. Upon examining the variables of this index, we find that most of them are manageable and

adaptable, subject to change at the local level by the state's policies. The United Arab Emirates has taken advantage of this opportunity.

In line with this direction, the Emirates Tourism Council was established in 2021, with the clear goal of improving the UAE's tourism portfolio by promoting cooperation among all relevant stakeholders in the tourism sector. Responsible for leading the development and approval of innovative tourist policies and legislation, the Council plays a crucial role in strengthening national tourism development strategies and creating an environment that attracts international investors to the local market. Moreover, the Council strives to establish a comprehensive and integrated national database dedicated to tourism information, aimed at enabling informed decision-making and strategic planning within the sector. (Richard Stolz., et al, 2023).

This research is based on some of the key points of developing the Travel and Tourism Competitiveness Index, which aims to guide the policies and investment decisions related to the development of the travel and tourism industry, based on the study of variables that fall under two axes of the structure of the Travel and Tourism Competitiveness Index: the axis of travel and tourism policy and enabling conditions and the axis of infrastructure within standard model that study the effects of the latter on the tourism revenues in the United Arab Emirates for the period 1992-2022.

LITERATURE REVIEW

In the realm of academic inquiry, there exists a focused examination of the service sector an integral component of the modern era. With unwavering dedication to the promotion of tourism development, a multitude of research investigations have been conducted. These studies, spanning both qualitative and quantitative methodologies, meticulously explore critical factors that impact the growth and optimization of the travel and tourism industry in distinct national economies and across a spectrum of global contexts.

In the context of scholarly inquiry, a specific focus is directed toward the political dimension. Notably, López-Gómez, García-Solanes, and Beyaert (2022) underscore the positive influence of legal sovereignty on tourist arrivals, while concurrently highlighting the adverse impact of corruption on tourism demand. Furthermore, Adedoyin, Seetaram, Disegna, and Filis (2023) have observed a counteractive effect of tourist taxes on arrival numbers. These scholars also delve into the examination of crises, encompassing events such as the Asian financial crisis, respiratory syndromes, tsunamis, epidemics, and terrorist attacks.

Corbet, O'Connell, Efthymiou, Guiomard, and Lucey (2019) illuminate the repercussions of these crises on European tourism, leading to a substantial decline in travelers—particularly business travelers. Notably, the COVID-19 pandemic has been meticulously analyzed for its detrimental impact on travel and leisure revenues by Lee and Chen (2022), a perspective corroborated by Laeeq Razzak Janjua, Sukjai, Rehman, and YU (2021) through their examination of tourist arrivals.

Additionally, Tran, Chen, Tseng, and Liao (2020) provide further clarity by expounding on the influence of the severe acute respiratory syndrome (SARS) experience in shaping the consequences of the COVID-19 virus on international tourism demand. This confluence of factors has culminated in the decimation of the tourism industry within four economies affiliated with the Asia-Pacific Economic Cooperation (APEC) organization: Taiwan, Hong Kong, Thailand, and New Zealand.

Adeola and Evans (2020) utilized the Generalized Method of Moments (GMM) to analyze dynamic panel data across 140 African countries. Their investigation revealed a reciprocal relationship between ICT levels and tourism. As ICT adoption increases, it positively influences international inbound travelers, boosts tourism revenues, and enhances overall sector returns. Lee, Chen, Wu, and Wenmin (2021) conducted quantitative regression analysis across 118 countries. They explored the impact of various technological variables, including internet usage, secure internet services, mobile cellular subscriptions, high-technology exports, fixed broadband subscriptions, communications, and computers. Interestingly, the nature of this impact varies based on the geographic location of the tourist destination.

These variations play a crucial role in shaping international tourism dynamics.Yang, Lin, and Han (2010) focused on the role of UNESCO World Heritage Sites in China. Using the Gravity Model, they found that these sites significantly impact international tourist inflows. Cultural variables associated with scenic and historic sites exert a fourfold effect compared to natural variables. The preservation and promotion of cultural heritage contribute significantly to attracting tourists. Jeje (2021) explored the economic dimensions of tourism. Increased capital investment emerges as a key driver for enhancing tourist arrivals. Moreover, the study revealed a reciprocal correlation between economic freedom, perceptions of corruption, foreign direct investment, trade openness, and the competitiveness of the tourism industry. However, a negative link was observed with GDP and government spending. ÇOBAN (2021) emphasized the importance of promoting economic freedom, safeguarding property rights, and removing constraints on business activities. These factors play a pivotal role in augmenting competitiveness within the tourism sector.

Anser et al. (2020) conducted an insightful study examining the influence of three environmentally damaging gases—carbon dioxide (CO2) emissions, methane (CH4) emissions, and nitrous oxide (N2O) emissions on the tourism industry. Notably, carbon dioxide emissions were found to significantly reduce domestic tourism, leading to a subsequent decline in overall tourism revenues. Furthermore, the adverse impact of methane and nitrous oxide emissions on inbound tourists was consistently negative, highlighting the repercussions of rising energy demand on international tourism arrivals and associated revenues.

Recognizing the limitations of existing studies, the World Economic Forum took a pivotal step in 2007 by creating a composite index that aggregates diverse influences. Initially guided by slogans from 2007 to 2013, this index expanded its scope in 2015 to incorporate new variables, thereby

providing a comprehensive view. The resulting Travel and Tourism Competitiveness Index has since served as a valuable metric for assessing destination competitiveness (Kubickova & Li, 2017).

The Travel and Tourism Competitiveness Index serves as a valuable tool for comprehending destination competitiveness and its multifaceted dimensions within the global tourism landscape. These diverse factors collectively shape the dynamic environment of travel and tourism, influencing both local and global contexts. Scholars have approached the index from various perspectives. Some studies analyze the overall index, while others delve into specific axes or sub-indicators. For example, Rodríguez-Díaz and Pulido-Fernández (2021) conducted an examination of the overall index, while Bazargani and KiliÇ (2021) simultaneously evaluated axes and sub-indicators. Additionally, Bedjaoui (2022), Litavcová, Juraj Síç (2021), Abdullah (2019), and Nazmfar, Eshghei, Alavi, and Pourmoradian (2019) explored specific thematic aspects emerging from the index.

METHODOLOGY

In our research, we aimed to analyze and quantify the short- and long-term relationship between the structure of the Travel and Tourism Competitiveness Index and UAE tourism development. Specifically, we examined how tourism revenues relate to the gross domestic product (GDP) by considering relevant variables within the travel and tourism policy domain. These variables include government spending on tourism relative to GDP, air transport infrastructure, and port facilities.

To achieve this, we employed a quantitative standard methodology using the autoregressive distributed lag (ARDL) co-integration technique. Initially proposed by Pesaran and Shin (1999) and later extended by Pesaran, Smith, and Shin (2001), the ARDL test process yields effective results regardless of whether the variables are stationary I(0), integrated of order one I(1), or mutually cointegrated (Pesaran et al., 2001). Our study focused on a small sample size, and we identified a single long-run relationship between the underlying variables.

In the context of the Autoregressive Distributed Lag (ARDL) model, there are two fundamental steps. Initially, we conduct an F-bounds test to evaluate the presence of a long-term relationship among the variables. Subsequently, we construct an Error Correction Model (ECM) based on the ARDL framework (Khelassi et al., 2023).

We utilized a set of variables, with one designated as the dependent variable indicating tourism development, while the remaining variables functioned as independents, reflecting the framework of Travel and Tourism Competitiveness Index in the UAE. The investigation spanned the period from 1992 to 2022, employing annual data with 31 observations for each variable. Data for the variables were gathered from various reputable databases. The table below illustrates the variables employed in the study.

Table 1: The study's variables and sources

	Variable	Variable Symbol	Measruing Unit	Source
Dependent	Tourism revenues relative to GDP	TR	%	https://www.theglobaleconomy.com
Independents	Government spending on tourism relative to GDP	GST	%	http://knoema.fr
	Quality of air transport infrastructure	QATI	1-7	https://www.theglobaleconomy.com
	Quality of port infrastructure	QPI	1-7	https://www.theglobaleconomy.com

Our study model takes the following functional form:

TR=f(GST,QATI,QPI)

Building upon the previous methodology, we specify the Autoregressive Distributed Lag (ARDL) version of our model as:

$$TR = B_0 + B_1 TR_{t-1} + B_2 GST_{t-1} + B_3 QATI_{t-1} + B_4 QPI_{t-1} + \sum_{i=1}^{p} y_1 \Delta TR_{t-p} + \sum_{i=1}^{p} y_2 \Delta GST_{t-p} + \sum_{i=1}^{p} y_3 \Delta QATI_{t-p} + \sum_{i=1}^{p} y_4 \Delta QPI_{t-p} + \varepsilon i$$

Where:

- $\boldsymbol{\varepsilon}$: *The error term.*
- $\boldsymbol{\Delta}$: *The first difference.*
- *TR: Tourism revenues relative to GDP.*
- *GST: Government spending on tourism relative to GDP.*
- *QATI: Quality of air transport infrastructure.*
- *QPI: Quality of port infrastructure.*

- (B_1, B_2, B_3, B_4): *long-run relationship coefficients.*
- (y_1, y_2, y_3, y_4): *short –run relationship coefficients.*

RESULTS AND DISCUSSION

In our investigation of time series stability and the degree of variable integration, we employed the Augmented Dickey-Fuller (ADF) test and the Phillip-Perron (PP) test. These tests evaluate the null hypotheses of unit root "non-stationarity" against the alternative hypothesis of "non-existence" of unit root "stationarity" (Smaili & Khelassi, 2021). Utilizing Eviews 13, we conducted ADF and PP unit root tests on all time series data, as summarized in Table 2. The results indicate that all variables exhibit the same order of integration, specifically I(1). Consequently, the bounds test method is applicable in this scenario. For our study spanning the period from 1992 to 2022, the ARDL model is the most suitable choice.

Table 2: Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) Test Results

Variables	ADF			PP			Order of Integration
	T-Statistic	P-Value	Critical Value 5%	T-Statistic	P-Value	Critical Value 5%	
TR	-5.496806	0.0001**	-2.967767	-5.498692	0.0001**	-2.967767	I(1)
GST	-6.098033	0.0000**	-2.967767	-6.084826	0.0000**	-2.967767	I(1)
QATI	-5.404907	0.0001**	-2.967767	-5.432510	0.0001**	-2.967767	I(1)
QPI	-4.824096	0.0006**	-2.967767	-4.828041	0.0006**	-2.967767	I(1)

Source: Authors' computations using Eviews 13 software..

After conducting the unit root test, the subsequent step involves selecting an appropriate lag length before applying the Autoregressive Distributed Lag (ARDL) bounds test. To demonstrate the relative lag length, we employ the Akaike Information Criteria (AIC).

The results of this analysis, presented in Figure 1, reveal that after estimating 20 models, the optimal lag length corresponds to (1, 1, 2, 2). Specifically, this indicates that the lag value is 1 for the two variables: tourism revenues relative to GDP and government spending on tourism relative to GDP. Regarding the quality of air transport infrastructure and port infrastructure, the lag amounts to 2.

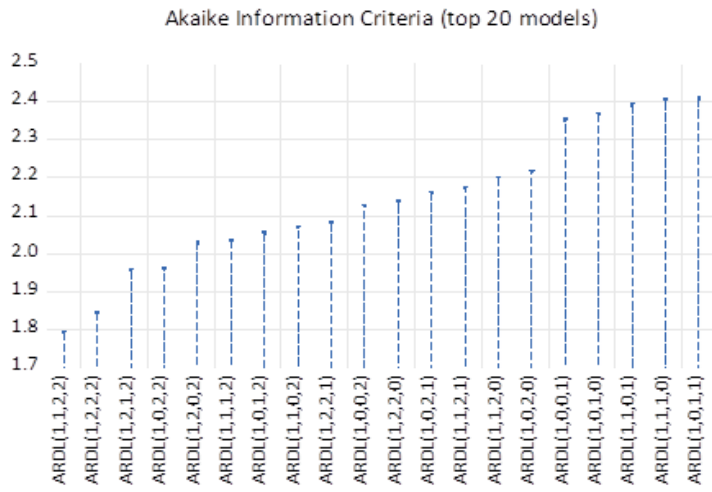

Figure 1: Optimal Lag Selection

Source: Authors' computations using Eviews 13 software..

In order to examine the existence of a long-run relationship between the variable representing tourism development and the variables associated with the travel and tourism index, we employ the bounds test and analyze the results presented in Table 3. Our findings indicate that the F statistic value (9.53) reported in the ARDL bounds exceeds the critical values at significance levels of 1%, 5%, and 10%. This suggests the feasibility of estimating an error correction model to explore the short- and long-term effects of the travel and tourism index on tourism development.

Table 3: ARDL Bound Test Results

Test Statistic			**Value**			
F-statistic			**9.539314**			
	10%		**5%**		**1%**	
Sample Size	**I(0)**	**I(1)**	**I(0)**	**I(1)**	**I(0)**	**I(1)**
30	2.676	3.586	3.272	4.306	4.614	5.966
Asymptotic	2.370	3.200	2.790	3.670	3.650	4.660
* I(0) and I(1) are respectively the stationary and non-stationary bounds.						

Source: Authors' computations using Eviews 13 software..

The subsequent stage involves estimating the Error Correction Model (ECM) and examining both the short-run and long-run relationships among the model variables. The outcomes of this analysis are presented in Table 4 as follows:

Table 4: Error Correction Model (ECM), Short-Run, and Long-Run Regression Results

ECM Regression, short-run				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GST)	0.836468	0.172446	4.850604	0.0001
D(QATI)	-5.823465	2.698749	-2.157839	0.0416
D(QPI)	6.483978	2.463973	2.631513	0.0149
CointEq(-1)*	-0.569828	0.074992	-7.598549	0.0000
R-squared	0.721328	Mean dependent var		0.245632
Adjusted R-squared	0.660747	S.D. dependent var		0.809940
S.E. of regression	0.471753	Akaike info criterion		1.517268
Sum squared resid	5.118667	Schwarz criterion		1.800157
Log likelihood	-16.00039	Hannan-Quinn criter.		1.605866
Durbin-Watson stat	1.543134			
*** p-value incompatible with t-Bounds distribution**				
Long-run				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
GST	2.353915	0.351566	6.695511	0.0000
QATI	26.69822	9.657967	2.764373	0.0106
QPI	-11.91812	5.700293	-2.090790	0.0469
C	-116.7977	32.36600	-3.608655	0.0013
CE = TR - (2.353915*GST +26.698224*QATI - 11.918116*QPI - 116.797727)				

Source: Authors' computations using Eviews 13 software..

From the analysis presented in Table 4, we observe that the error correction coefficient is

negative (-0.569828) and statistically significant, as its probability is below 5%. This implies that if tourism revenues relative to GDP (TR) deviate from equilibrium, the system will gradually return to its steady state position at an annual rate of approximately 56.98%. Additionally, the R-squared value (0.721328) indicates that the explanatory variables exert control over 72.13% of the variations in the size of tourism revenues relative to GDP (TR). Notably, this underscores a robust correlation between tourism development and the variables representing the Travel and Tourism Competitiveness Index.

In the short run, we observe significant relationships between variables. Specifically:

•Government spending on tourism relative to GDP (GST) and Quality of port infrastructure (QPI) exhibit positive impacts on tourism development at the 5% significance level.

•Quality of air transport infrastructure (QATI), while statistically significant at the 5% level, has a negative effect on tourism development.

Turning to the long-run relationship:

•Government spending on tourism relative to GDP (GST) and Quality of air transport infrastructure (QATI) continue to demonstrate positive impacts on tourism development at the 5% significance level.

•However, Quality of port infrastructure (QPI), also statistically significant at the 5% level, exerts a negative influence on tourism development in the long run.

In our diagnostic assessment of the model, we employed a battery of standard statistical tests to evaluate the suitability of the adopted model for estimating long-term flexibilities. Specifically, we conducted the following tests:

•***Inconsistency Test for Error Variance (ARCH Test):*** This test examines the presence of autoregressive conditional heteroskedasticity (ARCH) in the residuals. The correlograms of the squared residuals were analyzed to assess ARCH. If no ARCH is detected, the autocorrelations and partial autocorrelations should be zero at all lags, and the Q-statistics should not be significant.

•***Autocorrelation Test Between Errors (Serial Correlation LM Test):*** We investigated serial correlation in the residuals. The Durbin-Watson test is commonly used to detect AR(1) serial correlation, where autocorrelation might occur.

•Normal Distribution Test for Random Errors: We assessed the normality of the error terms.

The outcomes of these tests are summarized in Table 5 and Figure 2.

Table 5: ARCH Test and Serial Correlation LM Test Results

Heteroskedasticity Test: ARCH			
F-statistic	0.206229	Prob. F(1,26)	0.6535
Obs*R-squared	0.220345	Prob. Chi-Square(1)	0.6388
Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	1.048047	Prob. F(2,17)	0.3722
Obs*R-squared	3.183203	Prob. Chi-Square(2)	0.2036

Source: Authors' computations using Eviews 13 software.

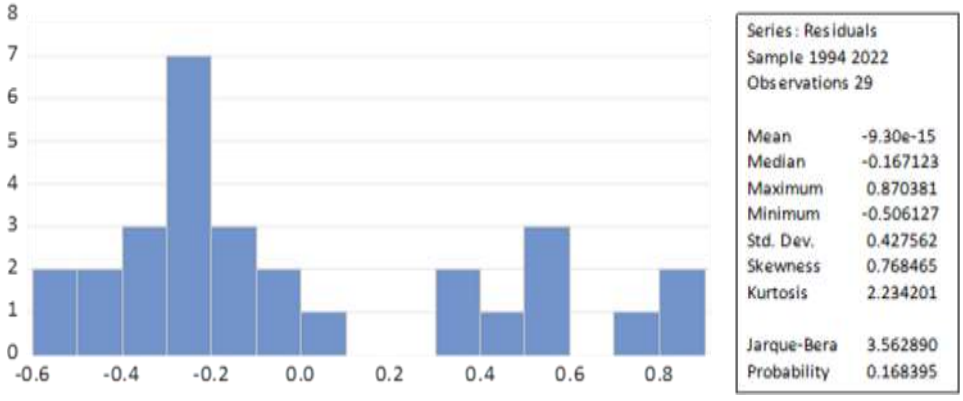

Figure 2: Normal Distribution Test for Random Errors

Source: Authors' computations using Eviews 13 software..

Our findings indicate that the residuals do not exhibit heteroscedasticity. Specifically:

•***ARCH Test:*** The F value associated with the ARCH test is 0.20, with a corresponding probability of 0.65. Since this probability exceeds the 5% significance level, we accept the null hypothesis, affirming the stability of the variance of the error term series.

•***Breusch-Godfrey Serial Correlation LM Test:*** The calculated F value for this test is 1.04, which is less than the critical table value. Additionally, the associated probability (0.37) exceeds 5%. Consequently, we accept the null hypothesis, indicating no sequential autocorrelation between errors.

•***Normality Assessment (Figure 2):*** Based on the Jarque-Bera statistic, the probability value is 0.16, exceeding the 5% threshold. Therefore, we cannot reject the null hypothesis, suggesting that the residuals follow a normal distribution.

In our investigation of the estimated parameters within the short- and long-term relationship, we

employed two statistical tests: the Cumulative Sum (CUSUM) test and the Cumulative Sum of Squares (CUSUM SQ) test. These tests are designed to assess the structural stability of coefficients over time. The results of these tests are presented in the figure 3.

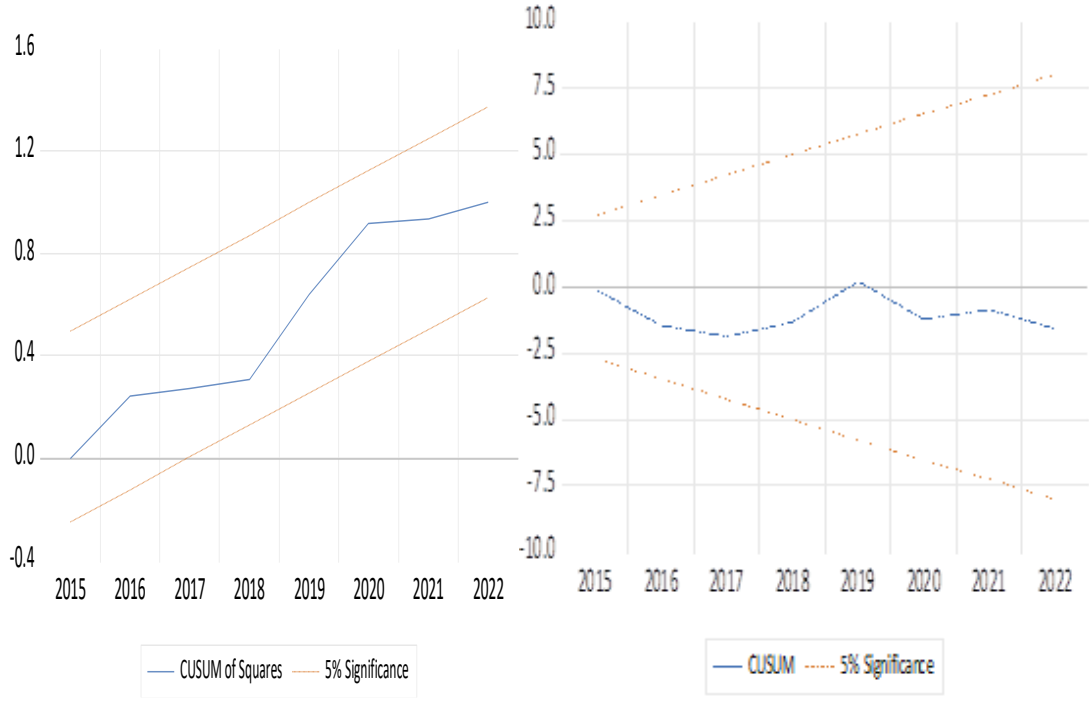

Figure 3: CUSUM and CUSUM SQ Test Results

Source: Authors' computations using Eviews 13 software..

Based on the findings from the tests presented in Figure 3, we observe both stability and consistency in the model across both long-run and short-run analyses. Consequently, we conclude that there is no evidence of structural change in the data used during the study period. Specifically, the CUSUM (cumulative sum) and CUSUM of squares statistics remain within the critical limits at a significance level of 5%. These results affirm the stability of the estimated parameters and support the hypothesis of constancy over time.

CONCLUSION

This study indicates that tourism development in the UAE depends on both economic and infrastructural factors, as well as on the Travel and Tourism Competitiveness Index. The error correction model shows that there is a long-run equilibrium relationship between tourism revenues relative to GDP and the explanatory variables, and that any short-run deviations are corrected at a relatively fast rate. The high R-squared value suggests that the model has a good fit and explains a large proportion of the variation in tourism development.

In the short run, the results reveal that government spending on tourism relative to GDP and quality of port infrastructure have positive effects on tourism development, meaning that increasing public investment and improving port facilities can enhance tourism revenues in the UAE. However, quality of air transport infrastructure has a negative effect on tourism development in the short run, indicating that there may be some trade-offs or crowding-out effects between air and port transport modes.

In the long run, the results demonstrate that government spending on tourism relative to GDP and quality of air transport infrastructure have positive effects on tourism development, suggesting that enhancing public expenditure and air transport quality can promote long-term tourism growth in the UAE. However, quality of port infrastructure has a negative effect on tourism development in the long run, implying that there may be some diminishing returns or substitution effects between port and air transport modes.

To conclude, our research recommends that the UAE should continue to invest in tourism infrastructure, especially in air transport, as it has a positive and significant impact on tourism development in both the short and long run. Moreover, the UAE should maintain its high performance in the Travel and Tourism Competitiveness Index, as it reflects its strong position in the global tourism market and its ability to attract and retain tourists. However, the UAE should also balance its spending and infrastructure development between air and port transport modes, as they may have different effects on tourism development in the short and long run. By doing so, the UAE can optimize its tourism potential and achieve sustainable and resilient growth.

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