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Econometric Modeling of the Impact of Tourism Revenues on Economic Growth in Algeria during the Period (1995–2017)

نمذجة قياسية لأثر الإيرادات السياحية على النمو الاقتصادي في الجزائر خلال الفترة (1995-2017)

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Abstract

The present article provides an empirical assessment of the impact exerted by tourism revenues on Algeria's economic growth through an ARDL modeling approach. Analyzing data over the 1995–2017 period, the Bounds Testing procedure identifies a stable long-run cointegration between real GDP and tourism-related earnings. A key finding is the error correction mechanism, which reveals a convergence rate of 23.36% per annum, implying a four-year duration for the rectification of disequilibria. Furthermore, although the analysis confirms that tourism revenues significantly and positively contribute to economic performance across both time horizons, the elasticity of growth relative to tourism receipts is found to be comparatively weak.

الكلمات المفتاحية:

النمو الاقتصادي

الإيرادات السياحية

التكامل المشترك

نموذج ARDL

ملخص

يهدف هذا المقال إلى دراسة قياسية لأثر الإرادات السياحية على النمو الاقتصادي في الجزائر، ولأجل هذا الغرض تم استخدام نموذج الانحدار الذاتي للفجوات الزمنية الموزعة المتباطئة (ARDL) وذلك بالاعتماد على بيانات سلاسل زمنية سنوية والتي تغطي الفترة الممتدة من 1995 إلى 2017. حيث أشار اختبار الحدود إلى وجود علاقة تكامل مشترك بين متغيرات الدراسة (الناتج المحلي الإجمالي الحقيقي، الإيرادات السياحية)، كما أسفرت النتائج التجريبية أيضا عن وجود علاقة تكامل مشترك بين الإيرادات السياحية والناتج المحلي الإجمالي الحقيقي، حيث قدرت سرعة التعديل من الأجل القصير إلى الأجل الطويل بـ 23.36%، أي أن سرعة تعديل الاختلالات ستستغرق حوالي أربع سنوات. كما أشارت النتائج التجريبية أيضا عن أثر إيجابي ومعنوي للإيرادات السياحية على النمو الاقتصادي في كل من الأجل القصير والأجل الطويل ولكن بنسب ضعيفة.

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1. Introduction

Tourism has held significant importance since ancient times in most countries and has received increasing attention, particularly as it has become a driving force for development and a key factor in economic progress. It is also considered a dynamic activity that complements other economic, social, and cultural activities. Furthermore, tourism represents a strong stimulus for increasing economic growth through its substantial contribution to attracting both domestic and foreign investments, thereby generating employment opportunities that help reduce unemployment rates, which have been steadily rising in most countries of the world, particularly in the context of recurring economic crises and structural changes in production systems.

In recent years, tourism activity has experienced remarkable development despite the challenges facing the global economy. The number of international tourist arrivals has increased for the seventh consecutive year, reaching approximately 1.235 billion tourists. As a result, the number of economic units associated with the tourism industry such as travel agencies, hotels, and related services has grown significantly. This expansion has also intensified competition among these units, leading to improvements in the quality of services provided and encouraging innovation in marketing strategies aimed at attracting customers.

Algeria is one of the countries endowed with substantial tourism potential. However, it still requires the adoption of a clear and effective strategy to promote its tourism assets and convey an accurate image capable of attracting both investors and tourists. Accordingly, the research problem of this study can be formulated as follows:

To what extent do tourism revenues influence economic growth in Algeria?

Sub-questions:

• What are the main fundamental concepts related to tourism revenues and economic growth?

• What is the current state of tourism revenues in Algeria?

• Can tourism be linked to economic growth, and what is the most appropriate model for establishing this relationship?

• To what extent does tourism contribute to the Algerian economy?

Research Significance:

This research is particularly pertinent given the ongoing economic debates in Algeria, as it offers an empirical evaluation of the nexus between tourism receipts and macroeconomic growth. By measuring these dynamics, the study addresses a critical component of the country's broader economic development strategy

Research Objectives:

This study aims to:

• Highlight the importance and position of the tourism sector in Algeria.

• Identify the role of tourism in promoting and increasing economic growth rates.

• The central aim of this study is to examine the impact of tourism generated revenues on Algerian economic expansion. Methodologically, the research leverages an econometric approach centered on the Autoregressive Distributed Lag (ARDL) cointegration technique, drawing upon time-series data covering the years 1995 through 2017.

Previous Studies:

The nexus between tourism-related activities and macroeconomic growth in Algeria has been the subject of extensive scholarly investigation ; however, their findings have been mixed. Among these studies are the following:

• **Mohamed Nasser Hamidatou and Nasr Hamidatou**:

This study sought to evaluate the impact of tourism activity on Gross Domestic Product in Algeria by estimating three econometric models using the multiple linear regression approach based on the Ordinary Least Squares (OLS) method. The results indicated a positive impact of both total investments and the net trade balance on GDP. However, "The

results indicate that tourism revenues do not exhibit statistical significance at the 0.05 level ($p > 0.05$), suggesting a lack of sufficient evidence to support a meaningful effect within the model." although they could be accepted at the 0.1 significance level, which explains the negligible contribution of tourism revenues to GDP compared with other variables.

• **Chokri Ben Zaarour and Rachid Satour**:

This study scrutinizes the nexus between national economic growth and the evolution of the tourism industry in Algeria. by constructing an econometric model using the cointegration methodology in order to test In the context of the tourism-led growth hypothesis, the study's results indicate that Engle Granger causality tests confirmed the existence of a unidirectional causal relationship running from tourism activity to economic growth.

• **Yahia Saidi and Selim Al-Amraoui**:

These researchers investigated the contribution of the tourism sector to the process of economic development in Algeria. Their findings concluded that tourism in the modern era represents an integrated industry capable of contributing significantly to social and economic development in many countries that have successfully developed it. In contrast, the tourism sector in Algeria suffers from several shortcomings and weaknesses in tourism development programs, which explains its limited contribution to development issues and the increasing tendency of Algerians to travel abroad for tourism. The study also demonstrated that the weak inflow of international tourists to Algeria is mainly due to the limited tourism supply, inadequate complementary services, high prices, and the weak inflow of foreign direct investment.

• **Houari Maâraj and Mohamed Suleiman Jardat**:

Their study addressed tourism as an alternative resource to oil exports. The results highlighted several key issues related to tourism, including:

o Traditional crafts and handicrafts constitute one of the most important components for tourism development in any country.

o Lack of professionalism in the sector.

o The phenomenon of seasonal tourism activity.

o Instability of the political and institutional framework responsible for managing the sector.

o Frequent changes in policies and strategies aimed at revitalizing the sector.

o Weak investments in infrastructure during previous years.

o Neglect of historical and tourist sites and insufficient attention to their preservation.

Research Methodology

This study adopts both the deductive and inductive approaches in order to address the theoretical and empirical aspects of the research topic. The deductive approach is applied through the descriptive analysis presented in the first chapter, which provides the theoretical framework of the study. The inductive approach is employed in the analytical stage through the examination, interpretation, as well as the derivation of empirical inferences regarding the causal relationship between tourism-generated receipts and the trajectory of economic growth.

To address the research problem, the study is grounded in the hypothesis that tourism revenues exert a positive and statistically significant influence on economic growth in both the short run and the long run.To test this hypothesis, the research is structured into three main sections:

- The Theoretical Framework of Tourism

- An Empirical Investigation of the Role of the Tourism Sector in the Algerian Economy

- The Empirical Study.

2. The Theoretical Framework of Tourism

Tourism initially emerged as a human activity essential for life, beginning in a simple and primitive form in terms of its appearance, causes, and objectives. Early forms of tourism were mainly associated with basic human needs such as searching for shelter, food, and water, hunting, or visiting particular human communities for social purposes. In the modern era, however, the tourism industry has evolved into one of the world's largest industries, possessing significant economic,

social, and cultural dimensions and objectives.

2.1 A Conceptual Framework for the Definition of Tourism

The definitions of tourism and the tourist have varied widely in modern literature. Some scholars define tourism as a social phenomenon, others consider it an economic phenomenon, while some view it as a factor that promotes human relations and cultural development. Among the most notable definitions are the following:

• The first definition of tourism was provided in 1905 by the German scholar Freuller E. Guyer, who characterized tourism as:

"A contemporary phenomenon resulting from the increasing demand for leisure and restorative activities, change of environment, appreciation of the beauty of nature, and the enjoyment and pleasure of staying in natural environments. It is also a result of the progress in transportation."

• The Austrian scholar Herman Von Schullern (1910) defined tourism as:

"A term applied to all interrelated processes, particularly the economic processes associated with the entry of foreigners, their temporary stay, and their movement within the borders of a specific region or country."

• **J. L. Michud**, a French geographer and administrative official, defined tourism as:

"A set of production and consumption activities that require specific movements outside the place of daily residence for at least one night, where the purpose of travel may include leisure, business, health, professional meetings, sports, or religious activities."

• **Dr. Salah El-Din Abdel Wahab (1994)**, defined tourism as:

"A set of relationships and services associated with the temporary and voluntary change of location, not motivated by commercial or professional purposes."

According to the World Tourism Organization (UNWTO), tourism is defined as a set of activities undertaken by individuals who travel to and temporarily stay in destinations outside their usual place of residence for purposes such as leisure, business, or other reasons.

2.2 Definition of the Tourist

Several definitions have been proposed for the concept of a tourist, including the following:

- According to Nourfal, a British researcher in tourism studies:

"A tourist is defined as an individual who enters a foreign country for purposes other than establishing permanent residence or undertaking regular and continuous employment in that country."

- The **United Nations Economic and Social Council, in its resolution adopted at the Rome Conference in 1963**, defined a tourist as:

"Any person who stays outside his or her usual place of residence for a period exceeding twenty-four hours but less than one year."

2.3. Tourism Attractions:

Tourism attractions can be summarized in several main components as follows:

2.3.1. Tourism Sites:

These include natural elements such as landforms, climate, forests, and landscapes, as well as human-made attractions such as parks, museums, and historical and archaeological sites

2.3.2. Transportation:

This includes all forms of transportation infrastructure and services such as roads, routes, and transportation modes (land, air, and sea transport).

2.3.3. Accommodation Facilities:

These include commercial establishments such as hotels, as well as private accommodation facilities such as guest houses

2.3.4. Supporting Facilities:

These include various complementary services such as tourism promotion and advertising, tourism administration, and banking services.

2.3.5. Infrastructure Services:

These include essential services such as water supply, electricity, telecommunications, markets, and

translation services.

3. The Role of the Tourism Sector in the Algerian Economy

3.1 Tourism Activity in Algeria

After independence, Algeria adopted an economic strategy primarily focused on industrial development, which did not assign significant importance to the tourism sector despite the country's considerable tourism potential. Later, national development plans (1966, 1967, and 1989) attempted to address this imbalance; however, these efforts were insufficient to significantly improve the image of the Algerian tourism product.

Subsequently, the deterioration of national security conditions during the 1990s, combined with political instability, negatively affected tourism activity. In recent years, however, with the improvement of the security situation, several indicators of the tourism sector have shown noticeable improvement. This progress can be attributed to the government's efforts to achieve economic reform and to the relative stabilization of the country's political and security environment.

3.1.1. Evolution of the Number of Tourists

The following table illustrates the development in the number of tourists visiting Algeria during the study period:

Table (01): Evolution of the Number of Tourists in Algeria during the Period 1995–2017.

Date	Number of Tourists	Rate of (%)Change
1995	515876	-
2000	865985	-
2005	1443090	-
2010	2070000	8.26
2011	2395000	15.70
2012	2634000	9.98
2013	2733000	3.76
2014	2301000	-15.31
2015	1710000	-25.68
2016	2030000	19.24
2017	2471000	20.41

Source: Prepared by the researcher based on World Bank data.

From the above table, it can be observed that tourism activity in Algeria remained relatively low during the period 1995–2000, mainly due to the security conditions experienced by the country at that time. The lowest level was recorded in 1995, when the number of tourists reached approximately 519,576 visitors. Tourism activity gradually recovered thereafter and experienced a steady increase between 2000 and 2013, reaching its peak in 2013 with approximately 2733000 tourists.

However, due to the global economic crisis that affected many countries during the period 2014–2015, the number of tourists visiting Algeria declined to approximately 1,700,000 tourists. Subsequently, during the period 2016–2017, the number of tourists increased again to around 2,451,000 visitors, which can largely be attributed to the relative improvement in the security situation and the growing attention given by the government to the tourism sector during this period.

3.1.2. Tourism Revenues

With reference to the number of tourist arrivals to Algeria during the period 2007–2017 did not experience significant growth, this situation had a negative impact on the financial inflows generated by the tourism sector. The table below depicts the temporal evolution of tourism revenues in Algeria during the period under review.

Table (02): Tourism Revenue Dynamics in Algeria (2007–2017)

Unit: Million US Dollars.

Year	2007	2008	2009	2010	2011	2012
Value	334	473	361	324	300	295
	15	**41.6**	**-23.7**	**-10.2**	**-7.4**	**-1.7**

Year	2013	2014	2015	2016	2017
Value	326	316	347	246	172
	10.5	**-3.1**	**9.8**	**-29.1**	**-30.1**

Source: Prepared by the researcher based on World Bank data.

From the above table, it can be observed that tourism revenues reached their highest peak in 2008, amounting to USD 473 million. During this period, tourism revenues experienced significant fluctuations.

They declined by approximately USD 112 million between 2008 and 2009, representing a decrease of 23.7%. Subsequently, revenues increased again, reaching USD 326 million in 2013, with a growth rate of 10.5%. However, they declined once more in 2016, falling to USD 246 million. This downward trend continued at a decreasing rate, reaching USD 172 million in 2017, which represents a decline of 30.1%.

3.2 Assessing the Contribution of the Tourism Sector to Real GDP

Tourism revenues constitute one of the components of Gross Domestic Product (GDP) and contribute significantly to increasing the rate of economic growth in many countries, particularly in developing economies. It should be noted that the contribution of tourism activity to GDP is often calculated based only on the revenues generated by the restaurants and hotels sector. This implies that several tourism-related revenues are not included in estimating the overall contribution of tourism revenues to GDP.

For example, revenues generated from domestic tourism are frequently excluded, especially when tourists prefer short stays or accommodation with relatives and friends. Moreover, tourism activity encompasses multiple interconnected activities resulting from the interaction of various economic sectors with tourism beyond the restaurants and hotels sector. These include sectors such as the food industry, construction and building, furniture manufacturing, transport and communication, domestic trade, and other infrastructure-related sectors.

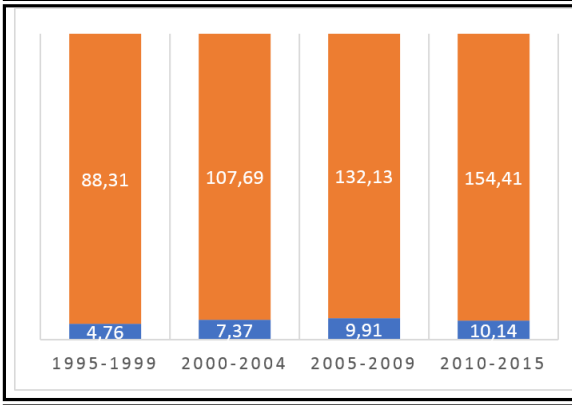
Table (03): The Macroeconomic Significance of the Tourism Sector to Real GDP

(Unit: Billion US Dollars).

Years	95-99	00-04	05-09	10-15
Real GDP	88.31	107.7	132.1	154.4
Real Tourism Output	4.76	7.37	9.91	10.14
Percentage Contribution of Tourism Output %	5.39	6.84	7.5	6.56

Source: Compiled by the researcher using data obtained from the World Bank.

Figure (01): The Catalytic Function of the Tourism Industry in Stimulating Real Aggregate Output



Source: Prepared by the researcher based on Table (03)

The average annual growth rate of tourism GDP during the period 1995–2015 reached approximately 6.01%. As shown in Table (03), the average tourism output during the period 2010–2015 increased by approximately 2.13 times compared with the average recorded during the period 1995–1999.

Furthermore, Table (03) and Figure (01) indicate that the average contribution of tourism activity to real Gross Domestic Product (GDP) ranged between 5.39% and 7.50% during the period 1999–2015. The modest performance of the tourism sector, along with its limited impact on GDP, is largely due to the lack of effective economic development initiatives in this sector since independence. In addition, the structure of the Algerian economic model largely based on domestic demand and on a development strategy prioritizing industrialization and agriculture as the main engines for accelerating economic development has also contributed to the marginal role played by tourism in the national economy.

4. The Empirical Study

4.1. Data and Methodology of the Study

To examine the influence of fluctuations in tourism-generated revenue on the economic trajectory of Algeria, this research utilizes a longitudinal dataset covering the years 1995 to 2017. Within this analytical framework, Real Gross Domestic Product (GDP) is adopted as the primary proxy for economic growth and serves as the dependent variable. Conversely, tourism

receipts constitute the central explanatory variable. The quantitative indicators employed throughout this empirical investigation were retrieved from the World Bank's comprehensive database.

In evaluating the long-run relationships between variables, this study adopts the ARDL model (Pesaran et al, 2001), which offers distinct econometric benefits over the Johansen and Engle Granger procedures. Unlike these traditional tests, which necessitate uniform integration levels, the ARDL technique is applicable to regressors that are either I(0) or I(1). This characteristic is particularly advantageous when dealing with a mixture of integration orders. However, a critical diagnostic prerequisite for the application of this model is the absence of I(2) variables, as the presence of such non-stationary series would invalidate the bounds testing procedure.

Another advantage of the ARDL approach is that it provides more reliable results in small sample sizes compared with other cointegration techniques. In our case, the Unrestricted Error Correction Model (ARDL–UECM) can be expressed as follows:

$$\Delta \mathbf{L}\boldsymbol{GDP}_t = \psi + \eta_0 \mathbf{LGDP}_{t-1} + \eta_1 \mathbf{LTR}_{t-1} + \sum_{i=1}^{p-1} \beta_{1i}\, \Delta \mathbf{LGDP}_{t-i} + \sum_{i=0}^{q-1} \beta_{2i}\, \Delta \mathbf{LTR}_{t-i} + u_t$$

$\boldsymbol{LGDP_t}$: Real Gross Domestic Product.
$\boldsymbol{LTR_t}$: Tourism Revenues.
$\boldsymbol{u_t}$: Random Error Term.

All variables were transformed into logarithmic form, since they are originally expressed in percentage terms. This transformation allows the estimated coefficients to be interpreted as elasticities, and it also helps mitigate the problem of heteroskedasticity in the residuals.

After determining the optimal lag length for the ARDL–ECM model using the Schwarz Information Criterion (SIC) which is considered the most appropriate criterion for small samples according to Pesaran et al. (2001) and estimating the model using the Ordinary Least Squares (OLS) method, The ARDL Bounds Test is utilized as the primary econometric instrument to verify the existence of a cointegrating nexus between the model's regressors. By evaluating the joint significance of the lagged levels of the variables, this test determines if the series are bound by a common stochastic trend. The hypotheses of the test in this case can be formulated as follows:

$$H_0: \eta_0 = \eta_1 = 0$$

$$H_1: \eta_0 \neq \eta_1 \neq 0$$

Following the bounds testing procedure of Pesaran et al. (2001), the calculated F-statistic is compared to the asymptotic critical value bounds. These thresholds are categorized into a lower bound I(0) and an upper bound I(1), providing a range within which the null hypothesis of no cointegration can be tested irrespective of the variables' integration properties

A calculated F-statistic below the lower bound leads to acceptance of the null hypothesis, indicating no cointegration among the variables. When the F-statistic falls between the lower and upper bounds, the test result remains inconclusive, and the existence of a cointegration relationship cannot be confirmed. In contrast, if the F-statistic exceeds the upper bound, the null hypothesis is rejected, indicating evidence of a cointegration relationship among the variables. Rejection of the null hypothesis thus confirms the presence of a long-run equilibrium relationship between the study variables, the next step consists of estimating the long-run model, which can be expressed as follows:

$$\mathbf{LGDP}_t = \alpha_0 + \alpha_1 \mathbf{LTR}_t + \varepsilon_t$$

The subsequent stage relies on the residuals obtained from the estimation of the long-run model, which are used to estimate the Error Correction Model (ECM) after determining the optimal lag length based on the Schwarz Information Criterion (SIC). The model can be expressed as follows:

$$\Delta \mathbf{L}\boldsymbol{GDP}_t = \theta_0 + \sum_{i=1}^{p-1} \theta_{1i}\, \Delta \mathbf{LGDP}_{t-i} + \sum_{i=0}^{q-1} \theta_{2i}\, \Delta \mathbf{LTR}_{t-i} + \theta_3 \boldsymbol{ECT}_{t-1} + v_t$$

The Error Correction Model (ECM) illustrates the short-run responsiveness of the dependent variable to changes in the explanatory variable. Additionally, the Error Correction Term ECT_{t-1} measures the speed of adjustment from the short run to the long run, indicating the time required to correct disequilibria and restore the system to its long-run equilibrium.

4.2. Analysis and Discussion of Estimation Results

4.2.1. Cointegration Test

The Bounds Test relies on the assumption that the time series of the study variables are integrated of order zero I(0), order one I(1), or a combination of I(0) and I(1) variables. If any variable is integrated of order two I(2), the Bounds Test becomes invalid and cannot be appliedor higher, the test cannot be applied.

This requirement makes it necessary to examine the unit root properties of the study variables. For this purpose, both the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test were employed to determine the integration order of each variable.

Table 04: Unit Root Test Results (ADF Test)

	(ADF Test)				Decision
	At Level I(0)		At First Difference I(1)		
	Constant & Trend	*Constant*	*Constant & Trend*	*Constant*	
$LGDP_t$	-0.8207 [0.9479]	-1.3711 [0.5773]	-3.9323 [0.0289]	-3.7728 [0.0103]	I(1)
LTR_t	-0.9683 [0.9283]	-2.1022 [0.2456]	-5.6044 [0.0010]	-4.9153 [0.0008]	I(1)

Source: Prepared by the researcher based on outputs from Eviews 9.

Table 05: Unit Root Test Results (PP Test)

	(PP Test)				Decision
	At Level I(0)		At First Difference I(1)		
	Constant & Trend	*Constant*	*Constant & Trend*	*Constant*	
$LGDP_t$	-1.0502 [0.9151]	-1.2795 [0.6200]	-3.9835 [0.0262]	-3.8726 [0.0083]	I(1)
LTR_t	-0.5388 [0.9729]	-2.1721 [0.2210]	-6.6357 [0.0001]	-4.9153 [0.0008]	I(1)

Source: Prepared by the researcher based on outputs from Eviews 9.

From Tables 04 and 05, it can be observed that all study variables namely, Real Gross Domestic Product (LGDP) and Tourism Revenues (LTR) become stationary after taking their first difference, at a 5% significance level. In other words, all variables are integrated of order one, I(1).

Table (06): ARDL Bounds Test

Significance Level			Tabulated F-Statistic F_{Tab}	Calculated F-Statistic F_{Cal}	
10%	5%	1%			
2.2	2.56	3.29	I(0)	Prob	Value
3.09	3.49	4.37	I(1)	0.012	4.506

Source: Prepared by the researcher based on outputs from Eviews 9.

From Table (06), it is observed that the calculated F-statistic equals 5.9, which is greater than the upper bound I(1) value of 4.16 at the 5% significance level. This result leads to the rejection of the null hypothesis (H_0), which posits the absence of a cointegration relationship, and the acceptance of the alternative hypothesis (H_1), indicating the existence of a long-run relationship among the study variables.

4.2.2. Interpretation of the Estimation Results of the ECM and Long-Run Model

Table (07) presents the estimation results of both the Error Correction Model (ECM) and the long-run ARDL model after determining the optimal lag length using the Schwarz Information Criterion (SIC). The results indicate that the optimal model is ARDL (1,2).

The error correction term (ECT) has a negative sign and is statistically significant at the 1% level, confirming the existence of a long-run equilibrium relationship between the study variables. The speed of adjustment from the short run to the long run is estimated at 23.36%, meaning that it would take approximately four years for deviations from equilibrium to be fully corrected.

The results also indicate a positive and statistically significant effect of tourism revenues on real GDP in both the short run and the long run. This positive effect can be explained by the fact that an increase in tourism revenues stimulates tourism activity by

attracting more tourists, thereby increasing foreign expenditure on tourism products, which effectively acts as an increase in exports. Additionally, this stimulates the demand for sectors linked to tourism, ultimately leading to an increase in real GDP, which reflects a higher rate of economic growth.

Table (07): Estimation Results of the Error Correction Model and Long-Run Model

Error Correction Model			
Variables	**Parameters**	**Student's t-Statistic**	**Probability**
ΔLTR_t	0.08412	1.8545	0.0054
ΔLTR_{t-1}	0.04339	0.7865	0.0341
ECT_{t-1}	-0.23367	-3.6309	0.0022
Long-Run Model			
C	0.59270	0.29762	0.0412
LTR_t	0.52021	4.97964	0.0001
Model Diagnostic Tests			
Adjusted R^2: 0.9669 White Test: 0.24 [0.93] Serial Correlation LM (1): 0.91 [0.35] Serial Correlation LM (2): 1.49 [0.25] Ramsey Reset : 0.14 [0.94] Jarque Bera : 0.39 [0.82]			

Source: Prepared by the researcher based on outputs from Eviews 9.

Regarding the diagnostic tests for the estimated model, Table (07) shows the following results:

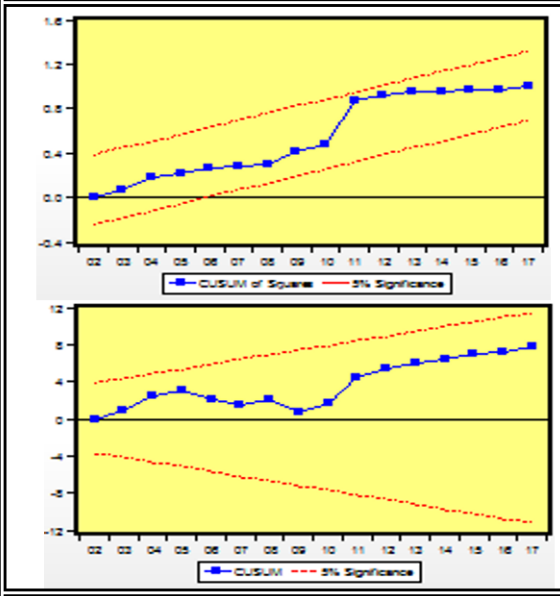
• The p-values corresponding to the LM test for autocorrelation at lag 1 and lag 2 are 0.35 and 0.25, respectively, which are not statistically significant, indicating that the estimated model does not suffer from serial correlation in the residuals.

• The p-value for the White test is 0.93, confirming that the residual variance is homoscedastic.

• The p-value for the Jarque-Bera test is 0.82, indicating that the residuals follow a normal distribution.

• The p-value for the Ramsey RESET test is 0.94, confirming the correct specification of the estimated model.

Figure (02): Results of the Structural Stability Test



Source: Medjahdi Khaled (2026)

Source: Prepared by the researcher based on outputs from Eviews 9.

Figure (02) illustrates the results of the structural stability test for the estimated model. It shows that both the cumulative sum of residuals (CUSUM) and the cumulative sum of squares of residuals (CUSUMSQ) remain within the 5% significance bounds, confirming that the model is structurally stable.

5. Conclusion

The tourism sector is one of the most important sectors attracting investment in both developed and developing countries, due to its high economic returns, especially in times when the extractive and manufacturing industries, as well as other sectors, face economic shocks. Moreover, achieving high and stable economic growth is a primary objective of macroeconomic policy.

This study aimed to conduct a quantitative modeling analysis of the impact of tourism revenues on economic growth in Algeria using the ARDL model over the period 1995–2017. To this end, the study examined the theoretical framework of the relationship between tourism revenues and economic growth, followed by an analysis of the actual economic growth and tourism revenues in Algeria.

The main findings from the empirical study can be

summarized as follows:

• There exists a cointegration relationship between tourism revenues and real GDP, with a speed of adjustment from short-run deviations to long-run equilibrium estimated at 23.36%, implying that it would take approximately four years for disequilibria to be fully corrected.

• Tourism revenues have a positive and statistically significant impact on real GDP in both the short run and the long run, albeit with relatively weak magnitudes. This indicates that the contribution of tourism revenues to economic growth during the period 1995–2017 was very modest relative to exports. This limited impact is largely due to Algeria's lack of a strategic and sustainable tourism policy, the absence of political stability, and the country's reliance on the hydrocarbon sector as the primary national resource.

Conflict of Interest

The author declares that there is no conflict of interest

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Appendices

. ARDL Bounds Test

ARDL Bounds Test
Date: 03/12/26 Time: 00:38
Sample: 1997 2017
Included observations: 21
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.906260	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.02	3.51
5%	3.62	4.16
2.5%	4.18	4.79
1%	4.94	5.58

Results of the Estimation of the Error Correction Model and the Long-Run Model

ARDL Cointegrating And Long Run Form
Original dep. variable: LGDP
Selected Model: ARDL(1, 2)
Date: 03/12/26 Time: 00:21
Sample: 1995 2017
Included observations: 21

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTR)	0.084122	0.045360	1.854562	0.0054
D(LTR(-1))	0.043397	0.055178	0.786504	0.0341
CointEq(-1)	-0.233673	0.064356	-3.630926	0.0022

Cointeq = LGDP - (0.5202*LTR +0.5927)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTR	0.520218	0.104469	4.979641	0.0001
C	0.592707	1.991474	0.297622	0.0412

LM :At the First Lag

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.913993	Prob. F(1,18)	0.3517
Obs*R-squared	1.063120	Prob. Chi-Square(1)	0.3025

LM :At the Second Lag

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.498406	Prob. F(2,14)	0.2572
Obs*R-squared	3.702639	Prob. Chi-Square(2)	0.1570

White Test

Heteroskedasticity Test: White

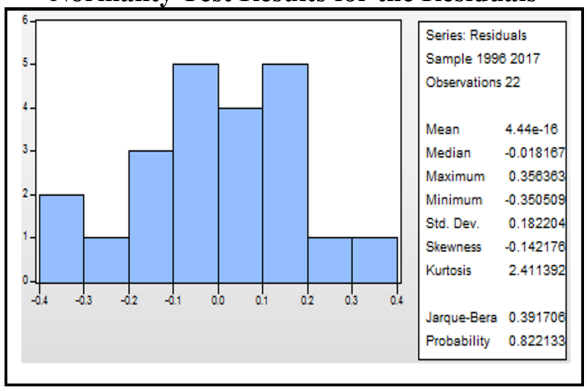
F-statistic	0.245684	Prob. F(5,16)	0.9359
Obs*R-squared	1.568644	Prob. Chi-Square(5)	0.9050
Scaled explained SS	2.444576	Prob. Chi-Square(5)	0.7848

Ramsey Reset Test

Ramsey RESET Test
Equation: UNTITLED
Specification: LGDP LGDP(-1) LTR LTR(-1) LTR(-2) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.124578	15	0.9472
F-statistic	0.142687	(1, 15)	0.9472

Normality Test Results for the Residuals



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