

The Impact of Tourism Sector Determinants on Economic Growth in Algeria during the Period 2000-2023 Using Autoregressive Distributed Lag (ARDL) Models

أثر محددات القطاع السياحي على النمو الاقتصادي في الجزائر خلال الفترة 2000/2023 باستخدام نماذج الانحدار الذاتي للفجوات الزمنية الموزعة والمتباطئة (ARDL)

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Abstract:

The tourism sector is considered one of the vital pillars that can effectively contribute to driving economic growth and diversifying national income sources, especially in light of the challenges associated with dependence on the hydrocarbons sector. This study aims to highlight the economic and social role of tourism in Algeria as a sector capable of absorbing the workforce and stimulating several related sectors, granting it a strategic position in achieving sustainable development.

In this regard, the study sought to determine the nature of the relationship between the tourism sector and economic growth (GDP) in Algeria during the period 2000–2023, using the Autoregressive Distributed Lag (ARDL) model. The empirical results revealed a long-term equilibrium relationship between the studied variables and confirmed the validity of the model against common econometric problems, as no autocorrelation was found in the residuals, and the estimates remained stable over time. Short-term results showed a weak dynamic relationship, while long-term results highlighted a significant impact of tourism expenditure in supporting growth, reinforcing the importance of directing investments towards this sector as a strategic option for diversifying the national economy.

Keywords: Tourism Sector, Economic Growth, ARDL Model, Algeria.

JEL Classification Codes: Q56, O47, C50, O55.

ملخص:

يعد القطاع السياحي من الركائز الحيوية التي يمكن أن تساهم بفعالية في دفع عجلة النمو الاقتصادي وتنويع مصادر الدخل الوطني، خاصة في ظل التحديات المرتبطة بالاعتماد على قطاع المحروقات. تهدف هذه الدراسة إلى إبراز الدور الاقتصادي والاجتماعي للسياحة في الجزائر، باعتبارها قطاعاً قادراً على استيعاب اليد العاملة وتنشيط العديد من القطاعات المرتبطة، مما يمنحها مكانة استراتيجية في تحقيق التنمية المستدامة.

ومن هذا المنطلق، سعت الدراسة إلى تحديد طبيعة العلاقة بين القطاع السياحي والنمو الاقتصادي (GDP) في الجزائر خلال الفترة 2000–2023، وذلك من خلال توظيف نموذج الانحدار الذاتي للفجوات الزمنية الموزعة المتباطئة ($ARDL$). وقد خلصت النتائج القياسية إلى وجود علاقة توازنية طويلة الأجل بين المتغيرات المدروسة، كما أكدت سلامة النموذج من المشاكل القياسية الشائعة، حيث لم يُسجَل وجود ارتباط ذاتي لبواقي الأخطاء، مع ثبات المقدّرات عبر الزمن. وقد أظهرت نتائج الأجل القصير وجود علاقة ديناميكية ضعيفة، بينما برز في الأجل الطويل أثر معنوي للإنفاق السياحي في دعم النمو، وهو ما يعزز أهمية توجيه الاستثمارات نحو هذا القطاع كخيار استراتيجي لتنويع الاقتصاد الوطني.

كلمات مفتاحية: القطاع السياحي، النمو الاقتصادي، نموذج $ARDL$ ، الجزائر.

تصنيفات JEL: Q56, O47, C50, O55.

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INTRODUCTION:

The conditions faced by developing countries require them to adopt rational policies across all economic sectors to stimulate national development in the medium and long term. This is necessary to encourage investment and catch up with developed countries. Tourism is one of the fastest-growing sectors globally, and it has thus become one of the most important service and commercial sectors, as well as a source of foreign currency. Tourism is more labor-intensive and is a key component in achieving development programs aimed at contributing to economic development.

From an economic perspective, tourism is a productive sector that offers numerous opportunities for establishing economic links with other sectors, earning foreign currency, improving the balance of payments, diversifying the economy, and providing employment opportunities. It also acts as an attraction for tourists, fulfilling their desires by visiting various natural sites. Thanks to Algeria's rich tourism potential, several types of tourism have emerged, including eco-tourism, religious tourism, medical tourism, and desert tourism. National authorities have supported the tourism sector in desert and semi-desert regions, allocating significant funds to promote this sector and achieve local and, ultimately, national development. However, the tourism sector in Algeria still faces many challenges that have prevented it from reaching the desired level despite the country's ample resources that could position it as a leader in the tourism industry.

Study Problem:

Algeria has made efforts to develop the tourism sector by enacting numerous laws and regulations. However, tourism flows to Algeria remain below the government's expectations. In 2018, the tourism sector's contribution to GDP was only 3.7%, and it accounted for just 3% of total employment. These figures are low compared to the global tourism sector's contribution. Therefore, this study aims to estimate or measure the contribution of the tourism sector to GDP based on the following central research question:

 **To what extent does the tourism sector contribute to Algeria's GDP between 2000-2023?**

Study Hypothesis:

To address the research problem, the following hypothesis was tested:

"There is an economic growth response to changes in the determinants of the tourism sector."

Research Significance:

Since the tourism sector is a crucial economic pillar in many countries' economies, this study examines the role that the tourism sector can play in Algeria's national economy. Despite its modest contributions compared to neighboring countries, the tourism sector's revenues are significant enough to impact GDP and drive economic growth beyond the oil sector.

Research Objectives:

The study seeks to achieve two main objectives:

- To analyze the economic role of the tourism sector in Algeria.
- To analyze the impact of tourism revenues on Algeria's economic growth.

Research Methodology:

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The study will adopt a quantitative approach, using statistical and econometric tools to measure the contribution of the tourism sector to Algeria's GDP in both the short and long term, using the ARDL model and the Eviews 13 program.

Previous Studies:

The following are some of the previous studies:

Rabeh Mounasser & Omar Bouchraïr (2019). "The Impact of the Tourism Sector on Economic Growth in Algeria: A Time-Series Analysis (1990-2014)": This study examined the impact of tourism revenues on economic growth in Algeria using the VAR model and Granger causality test from 1997-2014. It concluded that the tourism sector had no significant effect on growth, primarily due to the neglect of private tourism investments, leaving Algeria's economy heavily reliant on the oil sector. (Mounasser & Bouchraïr, 2019).

Awatif Khloot & Nabouia Aissa (2018). "The Effect of Tourism on Economic Growth in the Maghreb Countries (Algeria, Morocco, Tunisia)": This study assessed the impact of tourism on economic growth in Algeria, Morocco, and Tunisia from 1995-2015, finding that tourism contributed to economic growth in Morocco and Tunisia, but not in Algeria, where it remains an insignificant income source. (Khloot & Aissa, 2018).

Taher Jelit (2018). "A Time-Series Analysis of the Impact of Tourism Investment on Economic Growth in Algeria": This study evaluated the impact of tourism investment on economic growth, finding a weak positive relationship between tourism revenues and GDP, with a one-way causality running from economic growth to tourism investment. (Jalit, 2018)

Abdelkader Abdelrahman & Mohamed Mediani (2017). "The Impact of Tourism Investment on Economic Growth in Algeria": This study concluded that there is a positive relationship between tourism investment and GDP, suggesting that tourism investment plays a key role in reducing unemployment and inflation in Algeria. (Abdelrahman & Mohamed Mediani, 2017)

A. Rasheed Oluwaseyi (2019). This study assessed the relationship between economic growth (GDP) and tourism revenues in North African countries, showing that tourism can drive short-term economic growth by 6% and long-term growth by 29%. (Oluwaseyi, 2019).

F. Manzour & All (2019). This study found that tourism has a positive and significant impact on economic growth and employment in Pakistan between 1990-2015, recommending that policymakers focus on promoting tourism. (Manzoor, Wei, Asif, Zia ul Haq, & Rehman, 2019).

Taizeng Ren & All (2019). This study investigated the impact of tourism quality on economic development and environmental pollution in Mediterranean countries, emphasizing the need for sustainable tourism that balances growth with environmental protection. (Taizeng, Muhlis, Sudharshan, Jianchun, & Wanshan, 2019).

N. Selimi, L. Sadiku, M. Sadiku (2017). This study on the impact of tourism on economic growth in the Western Balkans from 1998-2014 found that tourism has a significant positive effect on GDP in these countries. (Selimi, Sadiku, & Sadiku, 2017).

F. Boudia & A. Elbachir (2016). This study analyzed tourism growth indicators in Algeria between 2005-2014, concluding that despite Algeria's rich tourism potential, the sector remains weak, though it has shown signs of improvement in recent years. (Elbachir & Boudia, 2016).

Kamel Bouadam (2011). This study analyzed Algeria's national tourism development strategy and found contradictions, with insufficient accommodation capacity and poor marketing, despite Algeria's potential to be a major tourist destination in North Africa. (Bouadam, 2011).

Said Boumendjel (2010): This study examined the economic and social conditions for sustainable tourism development in Algeria, arguing that tourism should be activated externally through embassies, consulates, and diplomatic efforts. (Boumendjel, 2010).

Y. Akan, I. Arslan, C. Isk (2007). This study analyzed the impact of the tourism sector on economic growth in Turkey, finding that international tourism revenues have a positive effect on economic growth. (Akan, Arslan, & Isk, 2007).

Commentary on Previous Studies:

The results of previous studies generally agree on the positive effect of the tourism sector on economic growth. This study aims to develop these findings further, asserting that tourism plays an important role in global economic growth, and its expansion can lead to positive economic outcomes, particularly in GDP and employment.

Based on the previous discussions, we will measure the contribution of the tourism sector to GDP as an important indicator of economic growth by evaluating the impact of tourism revenues on economic growth in Algeria from 2000 to 2023, using the ARDL model for both short—and long-term effects.

1- The Concept of Tourism:

Today, tourism is considered the primary driver of local development globally due to its impact on various other sectors (agriculture, traditional industry, culture, transport, services, architecture, construction, irrigation, industry, etc.). Tourism has become a significant social and economic phenomenon with multiple dimensions. In many countries, it has evolved into an industry with established foundations and regulations. Tourism reduces unemployment and poverty, supports growth, and serves as a source of wealth creation and sustainable income.

1-1 Definition of Tourism:

The concept of tourism is relatively modern, having only become clear in contemporary times after travel became an economic and social phenomenon. The definition of tourism varies based on the academic disciplines that study and analyze the phenomenon. (Hamed Nouredine, 2021, p. 46) Some definitions include:

Tourism is defined as the movement of individuals or groups from one place to another for social, recreational, or holiday purposes, attending conferences or festivals, or for medical treatment, and not for work or permanent residence. Migration or temporary work or study is not considered tourism. (Taleb & Wahrani, 2011, p. 2).

The World Tourism Organization defines it as A range of activities carried out by individuals during travel to destinations outside their usual environment for leisure or other purposes. (Houtia, 2014, p. 387).

1-2 Algeria's Definition of Tourism:

Algeria has adopted the definitions provided by the World Tourism Organization (WTO), with additional concepts specified by the Ministry of Tourism regarding the arrival of tourists and hotel establishments. These include:

- **Domestic tourist:** A person who enters Algerian territory, excluding those passing through.
- **Traveler:** Any individual entering Algerian territory, regardless of the reason for travel, nationality, or residence, excluding tourists on leisure or cruises who stay aboard the ships during their stay.
- **Cruise tourist:** Any individual who enters the national maritime borders and departs on

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the same ship they arrived on, remaining onboard for the entire duration of their stay.

- **Visitor:** Any person entering Algeria who does not engage in paid activities, which includes:
- **Tourist:** A temporary visitor staying for at least 24 hours for various reasons such as entertainment, family visits, holidays, health, education, religion, sports, business, etc.
- **Non-resident:** This refers to tourists, cruise tourists, travelers, and those crossing Algeria, excluding those on leisure or cruise trips.
- **Excursionist:** A visitor who stays in Algeria for less than 24 hours, including cruise tourists, excluding those legally prohibited from entering the country and residents working in Algeria. (Statistics, 2000, p. 275)

2- Sustainable Development:

The concept of sustainable development has undergone several transformations, starting from the concept of growth to economic growth, then development, and finally, sustainable development. This term was officially introduced in the 1987 report "Our Common Future" by the World Commission on Environment and Development, established by the UN General Assembly in December 1987, chaired by Gro Harlem Brundtland, the Prime Minister of Norway. (Al-Tawil, 2010, p. 79)

2-1 Definition of Sustainable Development:

The term sustainable development gained wide acceptance in the late 1980s after it appeared in the renowned "Brundtland Report" titled "Our Common Future," following the establishment of a UN commission tasked with proposing a global agenda for change in development practices. The Brundtland report emphasizes the urgent need to rethink our ways of life. (tracy & Bayley, 2008, p. 24)

According to the World Commission on Environment and Development (Brundtland Commission), sustainable development is defined as: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." It is a process of change where resources are exploited, investments are directed, and technological and institutional development is aligned in a way that enhances both current and future capacities to meet human needs and aspirations. (Al-Heiti, 2009, p. 14)

The Food and Agriculture Organization (FAO) defines sustainable development as the management and protection of the base of natural resources and the direction of technical and institutional change in a way that ensures the fulfillment of human needs for present and future generations. (Karbali & Hamdani, 2010, p. 11)

2-2 Dimensions of Sustainable Development:

The Brundtland Report emphasizes that any sustainable policy must integrate the three dimensions of economic, environmental, and social.

- **Economic Dimension:** A sustainable economic system can continuously produce goods and services, maintain a manageable balance between overall output and debt, and prevent social imbalances by redistributing income in favor of the poor.
- **Social Dimension:** The social dimension of sustainable development refers to the human aspect, where growth is seen as a means of social cohesion and a process of political selection. It brings social services such as health and education to those in need, ensures gender equality and political accountability, and encourages popular participation in

decision-making processes.

Environmental Dimension: Sustainable development principles advocate for legislation to protect the environment and energy resources and avoid over-exploiting non-renewable resources, ensuring that renewable resources are not overburdened and can regenerate themselves. This is crucial for preserving natural resources for future generations. (Boudarja, 2017, p. 607)

2-3 Goals of Sustainable Development:

Sustainable development aims to achieve several objectives (Nuzad, 2008, p. 15):

- **Reducing individual consumption of natural resources:** People in industrialized countries use significantly more natural resources per capita than those in developing countries. For instance, energy consumption from oil, gas, and coal in OECD countries is ten times higher than in developing countries combined.
- **Achieving rational exploitation and use of resources:** Sustainable development treats natural resources as limited, preventing their depletion or destruction and promoting rational usage and investment.
- **Linking modern technology to societal goals:** Sustainable development seeks to use modern technology to serve societal objectives, raising awareness of the importance of various technologies in development and how to apply them to improve the quality of life without causing adverse environmental impacts.

3- The Role of the Tourism Sector in Achieving Sustainable Development in Algeria:

Tourism is a relatively modern topic in economics. It has become widely used in various conferences and meetings due to its significant impact on national economies and its role in driving growth.

3-1 Definition of Sustainable Development:

Tourism development is defined as the provision of facilities and services to meet the needs and desires of tourists, which also includes some of the effects of tourism, such as creating new job opportunities and new revenue streams. Tourism development is considered a contemporary issue in many countries, as it aims to contribute to increasing real income levels, thus making it one of the main contributors to national income. Furthermore, it involves comprehensive civilizational development of all-natural and material components, making tourism development a tool for economic development. (Ben Faraj, 2009, p. 96)

3-2 Definition of Sustainable Development:

3-2-1 The Role of Tourism in Employment:

One of the most important characteristics of the tourism sector is its contribution to creating permanent or seasonal job opportunities, primarily in tourism establishments such as hotels, travel agencies, and tour guides. Crafts and hobbies also play a significant role in tourism, generating substantial income through the sale of souvenirs and handicrafts produced by artisans. Hobbies serve as an effective means of attracting tourists to the country, as well as creating new job positions. (Bouamoucha, 2012, p. 37) The following table illustrates the contribution of the tourism sector to employment from 2010 to 2023 as follows:

Table (1): Development of the Number of Employees in the Tourism Sector from 2010 to 2023
(in thousands)

Years	2010	2011	2012	2013	2014	2015	2016
Number	254	266.6	289.3	321.9	299.0	305.5	299.0
Years	2017	2018	2019	2020	2021	2022	2023

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Number	302.0	388.7	390	285	350	350	400
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Source: Algerian Ministry of Tourism, Directorate of Statistics

The development of the number of employees in the Algerian tourism sector from 2010 to 2023 shows an overall trend of gradual growth, accompanied by some fluctuations related to both the economic and health contexts. The number of employees increased from 254 thousand in 2010 to 321.9 thousand in 2013, reflecting a significant expansion in the sector during that period. However, the following years (2014-2017) saw a period of stability, with numbers fluctuating between 299 thousand and 305 thousand. The sector then experienced a significant leap in 2018 and 2019, reaching approximately 390 thousand employees, indicating an apparent dynamism in tourism employment. However, the COVID-19 pandemic negatively affected the sector, causing a decline to 285 thousand employees in 2020. Nevertheless, recovery began gradually from 2021, stabilizing at 350 thousand in 2021 and 2022 before reaching 400 thousand in 2023, the highest level in the time series. This indicates the return of tourism activity to its upward trend and the restoration of its employment capacity. However, despite this, the recorded growth in tourism employment remains modest compared to the untapped tourism potential in the country. (Chahid & Dferour, 2017, p. 183)

3-2-2 The Role of Tourism in GDP

Tourism is one of the most important activities contributing to the Gross Domestic Product (GDP) globally, which highlights the significance of this sector in the economies of development. The more the tourism sector is linked to other sectors of the economy, the higher its relative importance in the national economy, leading to the generation of additional revenues for these sectors. The following table illustrates the contribution of the tourism sector to GDP during the period 2010-2023 as follows:

Table (2): The Contribution of the Tourism Sector to GDP from 2010 to 2023

Years	2010	2011	2012	2013	2014	2015	2016
% Contribution	1.5	1.4	1.4	1	1.1	1.2	1.3
Years	2017	2018	2019	2020	2021	2022	2023
% Contribution	1.5	1.7	2.0	1.1	1.7	2.1	2.1

Source: Algerian Ministry of Tourism, Directorate of Statistics

The development of the tourism sector's contribution to Algeria's Gross Domestic Product (GDP) from 2010 to 2023 reflects a fluctuating performance linked to the country's economic and health situation. At the beginning of the period, the contribution ranged between 1.0% and 1.5%, indicating the limited role of tourism in the national economy and the underutilization of available tourism potential. Despite some slight improvement in 2015 and 2016, with contributions of 1.2% and 1.3%, respectively, the real jump began in 2017 and 2018, reaching 1.7%, signaling a growing institutional awareness of the sector's importance in economic diversification. In 2019, the contribution reached 2.0%, the highest level since the beginning of the decade, driven by efforts to support tourism investment. However, the COVID-19 pandemic caused an apparent setback in 2020, with the contribution dropping to 1.1%. The sector, however, showed its ability to recover, increasing the contribution again to 1.7% in 2021 and stabilizing at 2.1% in 2022 and 2023. This reflects a noticeable improvement and a gradual return to pre-pandemic levels, with the potential for higher contributions if tourism infrastructure is strengthened and both private and public investments are supported.

The low contribution of the tourism sector to GDP is attributed to the lack of economic development of this sector since independence, mainly due to the state's focus on the hydrocarbons sector, which has been considered the most important for achieving economic development. This is in contrast to many non-oil Arab countries such as Morocco, Tunisia, Bahrain, and Jordan, which place significant importance on the tourism sector as a key contributor to economic development. (Aqari & Belkheir, 2017, p. 4)

3-2-3 Contribution to the Balance of Payments:

Tourism represents one of the sources of hard currency in the balance of payments. The economic significance of tourism is measured by its impact on the country's balance of payments through the aggregation of tourism revenues and expenditures resulting from international tourism activity. The tourism balance reflects a dual movement of both incoming and outgoing tourism, which is expressed through tourism revenues that affect the credit side of the balance, while outgoing tourism affects the debit side. In general, tourism activity involves a dual movement of tourists, both inbound and outbound, meaning that a country can be both an exporter and importer of tourists at the same time. The following table illustrates the contribution of the tourism sector to improving the balance of payments from 2010 to 2023 as follows:

Table (3): Tourism Balance of Payments in Algeria from 2010 to 2023

Years	2010	2011	2012	2013	2014	2015	2016
Balance(-)	0.35	0.29	0.23	0.18	0.35	0.37	0.36
Years	2017	2018	2019	2020	2021	2022	2023
Balance(-)	0.36	0.37	0.38	0.22	0.30	0.32	0.34

Source: Algerian Ministry of Tourism, Directorate of Statistics

The development of the tourism balance of payments in Algeria from 2010 to 2023 reflects a continuous deficit, as tourism expenditures abroad exceeded domestic tourism revenues. The deficit started in 2010 at \$0.35 billion and gradually decreased to its lowest level in 2013 (\$0.18 billion), indicating a relative improvement in national tourism performance at the time. However, the period from 2014 to 2019 saw the return of the deficit to higher levels, ranging from \$0.35 billion to \$0.38 billion, due to continued weakness in Algeria's tourism attractiveness and increased domestic spending on foreign tourism. With the onset of the COVID-19 pandemic in 2020, the deficit shrank to \$0.22 billion due to travel restrictions and a general decline in tourism spending. However, with the beginning of recovery in 2021, the deficit rose gradually, recording \$0.30 billion, then \$0.32 billion in 2022, and \$0.34 billion in 2023. Despite this increase, the values remain below pre-pandemic levels, indicating a slight improvement in tourism balance. These figures highlight the sector's weak performance in generating hard currency, necessitating a priority focus on boosting both domestic and inbound tourism to achieve a future balance in the tourism balance of payments.

The reasons for the deficit are attributed to several factors, including (Issani, 2010, p. 5):

- Poor quality of Algerian tourism products and services;
- Insufficient and low-quality accommodation and hospitality services;
- The lack of tourism security prompts citizens to travel to other countries;
- A significant shortfall in marketing Algeria as a tourist destination both domestically and internationally;
- High-priced services for residents are of lower quality compared to neighboring countries.

4- Modeling and Testing the Cointegration Relationship Between the Tourism Sector and

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GDP for the Period 2000-2023 Using the ARDL Model:

In this section, we will attempt to build a model explaining the impact of tourism sector determinants on GDP for the period 2000-2023.

4-1 Pre-conditions:

After formulating the model, it is necessary to study the stability of the series in the model and determine the optimal lags.

4-1-1 Model Construction:

The ARDL test can be applied, and the study model is written as follows:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta LGDP_{t-i} + \sum_{t=0}^q \beta_2 \Delta LTOUR_REV_{t-i} + \sum_{t=0}^m \beta_3 \Delta LEXP_{t-i} + \sum_{t=0}^n \beta_4 \Delta LOIL_TAX_{t-i} + \alpha_1 LGDP_{t-1} + \alpha_2 LTOUR_REV_{t-1} + \alpha_3 LEXP_{t-1} + \alpha_4 LOIL_TAX_{t-1} + \varepsilon_t$$

Where:

LGDP: Log of Gross Domestic Product (Economic Growth Indicator);

LTOUR_REV: Log of Tourism Revenues;

LEXP: Log of Government Expenditure;

LOIL_TAX: Log of Oil Tax Revenues;

p, q, m, ...: Maximum lag periods for the dependent and independent variables in the model;

Δ: Represents first differences;

b_(0-4): Coefficients of the long-term relationship;

α_(1-4): Coefficients of the short-term relationship (Error Correction Model).

4-1-2 Unit Root Test:

The degree of integration for the model variables must be either I(0) or I(1), as shown in Table 04. Based on the Phillips-Perron test, we observe the stationarity of the variables at the first-degree

Table (4): Unit Root Test for Time Series Stationarity

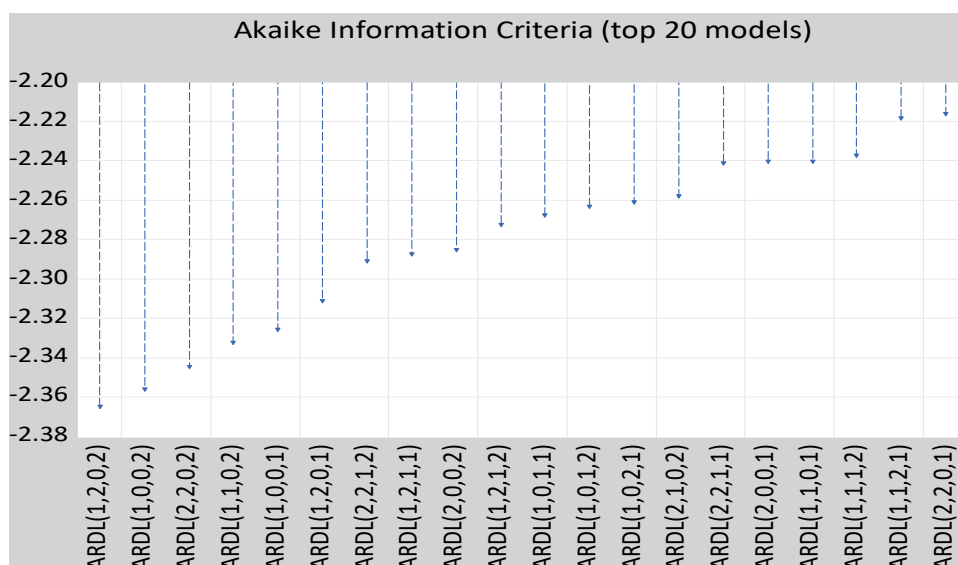
UNIT ROOT TEST RESULTS TABLE (PP)					
Null Hypothesis: the variable has a unit root					
	At Level				
With Constant	t-Statistic	LGDP	LTOUR_R	LEXP	LOIL_TAX
		-2.5406	-1.9064	-4.1173	-1.8107
	Prob.	0.1201	0.3234	0.0046	0.3658
		n0	n0	***	n0
With Constant & Trend	t-Statistic	-0.8814	-1.7950	-0.8991	-1.3457
	Prob.	0.9405	0.6724	0.9382	0.8483
		n0	n0	n0	n0
Without Constant & Trend	t-Statistic	3.8066	0.2928	3.6167	0.6535
	Prob.	0.9998	0.7615	0.9997	0.8497
		n0	n0	n0	n0
	At First Difference				
With Constant	t-Statistic	d(LGDP)	d(LTOUR_	d(LEXP)	d(LOIL_TAX)
		-4.3105	-2.3479	-3.7956	-3.8470
	Prob.	0.0032	0.1674	0.0098	0.0088
		***	n0	***	***
With Constant & Trend	t-Statistic	-6.3534	-1.5570	-5.6503	-4.7816
	Prob.	0.0002	0.7753	0.0009	0.0053
		***	n0	***	***
Without Constant & Trend	t-Statistic	-2.6325	-2.4281	-2.7379	-3.8908
	Prob.	0.0112	0.0179	0.0087	0.0005
		**	**	***	***
Notes:					
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant					
b: Lag Length based on SIC					
c: Probability based on MacKinnon (1996) one-sided p-values.					
This Result is The Out-Put of Program Has Developed By:					
Dr. Imadeddin AlMosabbeh					
College of Business and Economics					
Qassim University-KSA					

Source: EViews 13 Outputs

4-1-3 Optimal Lags for the Model:

Figure 04 illustrates the set of possible models when varying the lag periods based on the Schwarz Information Criterion statistic. This shows that the ARDL model (1.2.0.2) is optimal, as it has the lowest value according to the Akaike Information Criterion statistic, as demonstrated in the following figure:

Fig (1): Optimal Lags Test



Source: EViews 13 Outputs

4-2 Residual Diagnosis:

After determining the ARDL model (1.2.0.2) for studying both short- and long-term effects, it is necessary to confirm its validity and quality through the following tests:

Table (5): Model Quality Tests

Statistic	Value	Significance
Normality test		
Jarque-Bera	1.18	0.55
Serial correlation LM test		
Obs*R-squared	0.321	0.85
Heteroskedasticity test (ARCH)		
Obs*R-squared	0.743	0.38

Source: See Appendices 01-03

From the table, we observe:

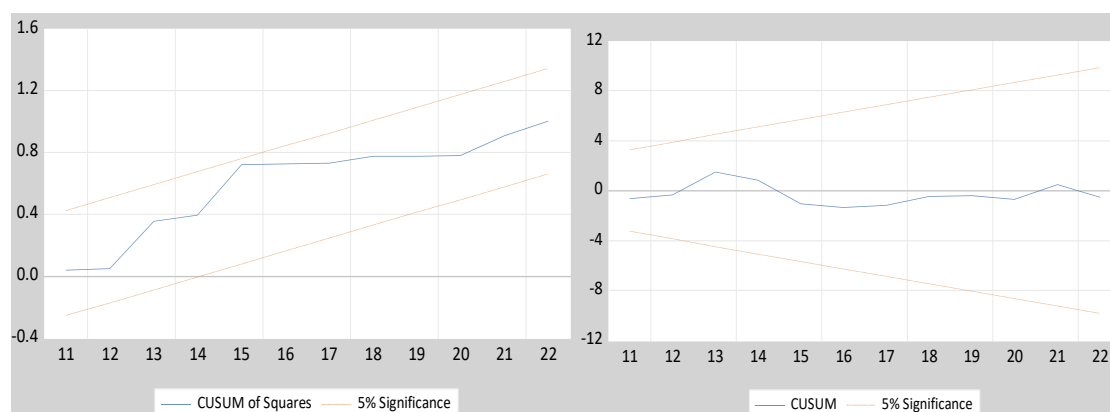
- **For Normal Distribution:** According to the value of J-B = 1.18, which is less than $\chi^2 = 5.99$ (and α is non-significant (>0.05)), the residuals of the model follow a normal distribution.
- **For Autocorrelation of Errors:** According to the LM test, the probability of the Chi-squared Test is greater than 0.05. Thus, we accept the null hypothesis, stating that there is no autocorrelation between the errors.
- **For Homoscedasticity:** According to the ARCH test, the probability of the Chi-squared Test is greater than 0.05, so we accept the null hypothesis that the variance is homogeneous and stable over time.

☛ Stability Test:

To study the structural stability of the estimated model, it is necessary to track the residuals of the model, as well as the squared residuals, as shown in the following figure:

Fig (2): Model Stability Test

The Impact of Tourism Sector Determinants on Economic Growth in Algeria during the Period 2000-2023 Using Autoregressive Distributed Lag (ARDL) Models



Source: EViews 13 Outputs

Since the graphical representation in both the CUSUM Test and the CUSUM of Squares Test lies within the optimal bounds, this confirms the structural stability of the selected model, which represents the relationship between tourism sector determinants and economic growth in Algeria.

4-3 Testing Model Estimates in the Short and Long Run:

To determine the estimated relationship and assess the effects in both the short and long term, it is necessary to study the presence of cointegration between the determinants of the tourism sector and economic growth in Algeria.

4-3-1 Cointegration Test Using the Bounds Test Method:

The following table shows the results of the cointegration test using the Bounds Test methodology:

Table (6): Bounds Test

Null hypothesis: No levels relationship
Number of cointegrating variables: 1
Trend type: Rest. constant (Case 2)
Sample size: 23

Test Statistic	Value
F-statistic	4.382863

	10%	5%	1%			
Sample Si	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
30	3.303	3.797	4.090	4.663	6.027	6.760
Asymptotic	3.020	3.510	3.620	4.160	4.940	5.580

* I(0) and I(1) are respectively the stationary and non-stationary bounds.

Source: EViews 13 Outputs

According to the table's results, the calculated F-statistic is greater than the critical values at most significance levels. Therefore, we reject the null hypothesis, which states that there is no cointegration relationship between the determinants of the tourism sector and economic growth in Algeria. This indicates the presence of a long-term equilibrium relationship.

4-3-2 Study of the Short-Term Relationship:

Appendix 04 illustrates:

- **Tourism revenues** have a slight effect on economic growth in Algeria in the short term, amounting to only 0.06%. This reflects the limited role of the sector as an immediate driver of growth. This weak effect can be attributed to several factors, including poor tourism infrastructure, lack of effective promotional strategies, and limited contribution of international tourism to GDP. Moreover, Algeria's near-total reliance on hydrocarbons has

made tourism a secondary sector that is not relied upon to drive economic activity in the short term. Although the sector may create local jobs and boost certain services, its actual financial contribution to growth remains limited. To achieve a greater impact, it is necessary to increase tourism revenues by attracting more foreign tourists, promoting domestic tourism, and reducing the deficit in the tourism balance of payments. Moreover, shifting toward a diversified economy would give tourism a strategic role that could enhance its impact in the medium and long term.

- **Government spending** directed to the tourism sector does not affect economic growth in the short term, which several economic and structural considerations can explain. On the one hand, this spending is often directed towards long-term projects such as infrastructure development and tourist area development, investments that take time before their effects are felt in the economy. On the other hand, this spending may be inefficient and lack strategic direction, limiting its ability to stimulate GDP in the short term. Bureaucracy and procedural complexities can also delay project implementation, thus delaying the expected economic effects. Therefore, the weak short-term effect does not mean the absence of tourism spending's developmental role but suggests that its effect is more apparent in the medium and long term, provided that it is accompanied by improvements in governance, enhanced spending effectiveness, and linked to structural reforms in the sector.
- **Oil taxation** has a positive effect of 0.09% on economic growth in the short term, reflecting the continued rentier nature of the Algerian economy and its heavy reliance on oil revenues. Although this percentage seems limited numerically, it surpasses the effect of tourism revenues (0.06%) and highlights the larger relative weight of energy revenues in driving GDP in the short term. This effect is attributed to oil taxes directly fueling the state's treasury and financing public expenditure, including wages, subsidies, and infrastructure projects, thus stimulating the economic cycle. However, the limited effect also reflects oil market fluctuations and the instability of revenues, as well as the fragility of the links between rentier taxation and productive growth. Therefore, this highlights the need for structural reforms to reduce dependence on rents and direct a larger share of oil revenues toward sustainable sectors such as tourism and manufacturing to ensure more balanced and sustainable economic growth.
- There is a dynamic short-term relationship between economic growth and the determinants of the tourism sector in Algeria, with an error correction coefficient of -0.37 (CointEq(-1)), which is negative and statistically significant. This means that about 37% of the disequilibrium between economic growth and tourism determinants is corrected in each period (usually annually), reflecting a moderate speed of return to long-term equilibrium. The negative sign of this coefficient indicates that a long-term relationship between the variables exists, a prerequisite for cointegration. Thus, the results confirm that the Algerian economy reacts dynamically to tourism variables (such as revenues, spending, and oil taxation), being affected differently in the short term but gradually moving toward equilibrium over time. These results underscore the importance of developing consistent and sustainable tourism policies that enhance the sector's role in achieving stable growth in the medium and long term.

4-3-3 Study of the Long-Term Relationship:

Appendix 05 illustrates:

The Impact of Tourism Sector Determinants on Economic Growth in Algeria during the Period 2000-2023 Using Autoregressive Distributed Lag (ARDL) Models

- The results show that the coefficient of **tourism revenues** in the long term is 0.0694, which is statistically insignificant. Despite the positive sign, this result indicates that tourism revenues do not have a significant impact on economic growth in Algeria in the long term. This can be explained by the relatively low tourism income compared to the size of the national economy, along with Algeria's primary reliance on domestic tourism and the weak attraction of foreign tourists. Furthermore, the lack of effective investments in the sector, along with poor infrastructure and promotion, has reduced the ability of tourism revenues to impact real growth.
- **Government spending** results confirm a substantial and long-term relationship between tourism spending and economic growth, with a coefficient of 0.7182, which is statistically significant at the 0.0058 level. This indicates that increasing tourism spending, whether public or private, positively reflects on economic activity in Algeria, primarily through activating service sectors like transport, hospitality, and handicrafts. Tourism spending also contributes to job creation and stimulates local production, particularly in tourist areas reliant on domestic demand. This result highlights the importance of redirecting public policies toward supporting and expanding productive tourism spending as an effective way to enhance growth.
- As for **oil taxation**, the coefficient showed a negative value of (-0.0729) and was statistically insignificant. This means that oil revenues do not leave a significant impact on economic growth in the long term. This result reflects the rentier nature of Algeria's economy, where oil revenues are primarily used to finance current expenditures and subsidies without being effectively directed to productive, sustainable sectors. Additionally, oil price fluctuations globally, along with poor governance in the distribution of these resources, limit the sustainability of their effect on growth. This result aligns with the literature on the "resource curse," which suggests that economies dependent on natural resources tend to have weak long-term economic performance unless they diversify their production base.

Conclusion:

Despite Algeria's significant natural and tourism potential, the tourism sector still contributes only a small share to economic development. This is mainly due to the country's reliance on the hydrocarbons sector, which is seen as more important for achieving economic development. Therefore, the tourism sector should be given more attention through infrastructure development, particularly in building hotels and recreational facilities, which have a role in creating jobs and reducing unemployment. Additionally, increasing awareness about the importance of tourism within society and promoting a tourism culture would help achieve tourism goals, which are aligned with economic development objectives.

Regarding the applied study, the impact of tourism sector determinants on economic growth in Algeria from 2000 to 2023 was examined. The results of the econometric model revealed an apparent variation in the impact of tourism sector determinants on economic growth between the short and long terms. In the short term, it was found that the relationship is dynamic, with a relatively weak but statistically significant effect on tourism revenues (0.06%), while government spending showed no significant effect, and oil taxation had a limited effect (0.09%), reflecting the temporary and incidental nature of tourism and rentier variables in short

periods, often due to seasonal or situational fluctuations. This is further supported by the error correction coefficient of -0.37, indicating that the economy corrects 37% of the disequilibrium in each period and also pointing to the existence of a long-term equilibrium relationship.

In the long term, the results showed that tourism spending was the only determinant with a positive and significant effect on growth, while both tourism revenues and oil taxation were insignificant. This result underscores that what does not show an effect in the short term may materialize in the long term if sustainability and management efficiency are achieved, as seen with tourism spending. On the other hand, the weak effect of oil taxation in both the short and long terms confirms the limited role of rents in supporting real growth and strengthens the call for economic diversification.

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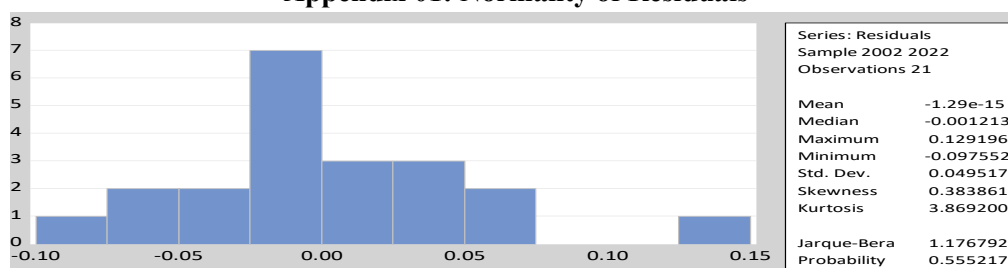
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-Appendices

Appendix 01: Normality of Residuals



Source: EViews 13 Outputs

Appendix 02: Serial Correlation of Errors Test

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.077859	Prob. F(2,10)	0.9257
Obs*R-squared	0.321994	Prob. Chi-Square(2)	0.8513
Test Equation: Dependent Variable: RESID Method: ARDL Date: 07/09/25 Time: 19:44 Sample (adjusted): 2002 2022 Included observations: 21 after adjustments Presample missing value lagged residuals set to zero.			

Source: EViews 13 Outputs

Appendix 03: Heteroscedasticity Test

Djorfi Zakaria

Heteroskedasticity Test: ARCH			
F-statistic	0.694220	Prob. F(1,18)	0.4157
Obs*R-squared	0.742711	Prob. Chi-Square(1)	0.3888
Test Equation: Dependent Variable: RESID^2 Method: Least Squares Date: 07/09/25 Time: 19:46 Sample (adjusted): 2003 2022 Included observations: 20 after adjustments			

Source: EViews 13 Outputs

Appendix 04: Error Correction and Short-Term Coefficients Estimation Results

Dependent Variable: D(LGDP)
 Method: ARDL
 Date: 07/09/25 Time: 19:33
 Sample: 2002 2022
 Included observations: 21
 Dependent lags: 2 (Automatic)
 Automatic-lag linear regressors (2 max. lags): LTOUR_REV LEXP
 LOIL_TAX
 Deterministics: Unrestricted constant and no trend (Case 3)
 Model selection method: Akaike info criterion (AIC)
 Number of models evaluated: 54
 Selected model: ARDL(1,2,0,2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COINTEQ*	-0.370019	0.108410	-3.413157	0.0039
D(LTOUR_REV)	0.066231	0.033601	1.971125	0.0674
D(LTOUR_REV(-1))	-0.079005	0.042642	-1.852763	0.0837
D(LOIL_TAX)	0.094650	0.045604	2.075448	0.0556
D(LOIL_TAX(-1))	-0.083397	0.042468	-1.963748	0.0684
C	1.361900	0.377539	3.607306	0.0026
R-squared	0.703460	Mean dependent var		0.080600
Adjusted R-squared	0.604614	S.D. dependent var		0.090931
S.E. of regression	0.057177	Akaike info criterion		-2.650371
Sum squared resid	0.049038	Schwarz criterion		-2.351936
Log likelihood	33.82889	Hannan-Quinn criter.		-2.585603
F-statistic	7.116693	Durbin-Watson stat		1.994561
Prob(F-statistic)	0.001356			

* p-values are incompatible with t-Bounds distribution.

Source: EViews 13 Outputs

Appendix 05: Long-Term Coefficients Estimation Results

Deterministics: Unrest. constant (Case 3)				
CE = LGDP(-1) - (0.069400*LTOUR_REV(-1) + 0.718203*LEXP - 0.072906*LOIL_TAX(-1))				
Variable *	Coefficient	Std. Error	t-Statistic	Prob.
LTOUR_REV(-1)	0.069400	0.144495	0.480298	0.6368
LEXP	0.718203	0.229613	3.127886	0.0058
LOIL_TAX(-1)	-0.072906	0.218945	-0.332985	0.7430
Note: * Coefficients derived from the CEC regression.				

Source: EViews 13 Outputs