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MODELING THE RELATIONSHIP BETWEEN SUSTAINABLE DEVELOPMENT INDICATORS AND ECONOMIC GROWTH USING ECONOMETRIC TECHNIQUES

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Abstract

In recent years, sustainable development has received significant global attention. It is no longer considered a theoretical luxury but has become a fundamental requirement for achieving equity in the distribution of the benefits of economic growth and wealth across present and future generations. Sustainable development now represents a crucial tool for addressing the growing challenges faced by societies.

This has posed major issues for many countries and has motivated the adoption of this study. The aim is to explore the relationship between sustainable development and economic growth in Algeria by analyzing data from the period 1990 to 2022. The analysis was conducted using the EViews 12 statistical software.

Keywords: Sustainable development, economic growth, modeling, econometrics.

INTRODUCTION

Sustainable development has emerged as a global concern in recent years. It is no longer merely a theoretical ideal but a necessary path to ensure fairness in sharing the outcomes of economic development and wealth between current and future generations. This concept is grounded in the coordination between resource use, investment strategies, technological choices, and institutional frameworks, ensuring coherence and consistency among them.

This situation has led developing countries to intensify efforts to create a stable investment environment. They are also striving to shift growth sources away from oil towards non-oil sectors and to diversify economic activity by promoting the private sector. Furthermore, they are moving from import-substitution strategies to export-oriented competitiveness. These efforts aim to achieve a fundamental goal: increasing economic growth rates.

Economic growth plays a central role in achieving sustainable development. However, sustainable development also encompasses other vital dimensions, particularly social and environmental aspects. In many developing countries, development policies seek to emulate the outcomes achieved in economically advanced countries. Yet, they often

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overlook the prerequisites for success, which has led to the failure of many such initiatives. In contrast, developed countries have succeeded in integrating sustainable development because their social policies are central to their national development strategies. In these countries, sustainable development is considered a core driver of economic growth.

Based on the above, the central research question can be formulated as follows: To what extent do changes in the dimensions of sustainable development affect economic growth in Algeria during the period 1990–2022?

General Concepts on Economic Growth

When discussing this topic, it is important to clarify that economic growth is not merely the increase in gross domestic product (GDP). It must also lead to a rise in real per capita income. In other words, the growth rate of GDP should exceed the rate of population growth. In some cases, a country's GDP may increase, but if the population grows at a faster pace, the average real income per person may not rise. Despite the increase in output, such a country cannot be said to have achieved true economic growth[1].

Economic growth can be defined as a continuous process through which an economy's productive capacity increases over time, aiming to raise levels of national output and national income[2]

The Concept of Sustainable Development

Sustainable development was officially introduced for the first time in the report of the World Commission on Environment and Development titled Our Common Future. This marked the first formal use of the term in 1987. Since its emergence in the early 1980s, the concept has been defined in various ways. One of the most widely accepted and frequently cited definitions describes it as: “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs”[3]

Several definitions have been proposed for sustainable development. One of the most well-known is the definition by the World Commission on Environment and Development, which described it as: “Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.”

Another widely recognized definition comes from the International Union for Conservation of Nature. It defines sustainable development as: "Development that considers the environment, the economy, and society."

The National Committee for Environment and Sustainable Development also defines it as: “Development that satisfies the needs of the current generations without undermining the ability of future generations to satisfy their own needs.”

[1] Mouhouni, M. (2014/2015).*The Impact of Education on Economic Growth*(Doctoral dissertation). University of Algiers 3, p. 23..
[2] Todaro, M. (2006).*Economic Development*(Translated by Mahmoud Hassan Hussein & Mahmoud Hamed Mahmoud). Al-Marrikh Publishing House, Riyadh, Saudi Arabia, p. 31.
[3] Vaillancourt, J. (1998).*Conceptual and Historical Evolution of Sustainable Development*. L'Atelier d'aménagement, d'urbanisme et d'environnement, 2nd Edition, Quebec, p. 26.

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From an economic perspective, sustainable development has also been defined in terms of the optimal management of natural resources. These definitions emphasize maximizing the benefits of economic development while preserving the quality and availability of natural resources[4]

1. Characteristics of Sustainable Development

There are different types of development. Each type is defined by certain features that make it distinct from the others. Sustainable development is characterized by a number of specific traits that set it apart from other forms of development. These include[5]:

- It leads to an increase in the individual's share of real income.
- It promotes the optimal use of natural resources. This is a core goal of sustainable development, which results in the protection and preservation of these resources.
- It supports social justice by aiming for environmental balance, through both resource conservation and efficient utilization.
- It is a form of development that addresses both present and future needs across all sectors. It takes into account the rights and needs of future generations.
- Unlike other forms of development that are often limited to a specific field, sustainable development integrates environmental, social, and economic dimensions[6]

- Sustainable development follows rational approaches to the use of resources, whether renewable or non-renewable, to ensure balance across different areas.
- It creates an integrated relationship between development and the environment, aiming to achieve comprehensive development across all sectors.

2. Dimensions of Sustainable Developmen[7]:

- **Environmental Dimension:** This focuses on the preservation and optimal use of natural resources. It encompasses elements such as energy, biodiversity, and adaptability. Major environmental concerns include rising global temperatures, ozone layer depletion, overexploitation of natural resources, and various issues related to air pollution.
- **Economic Dimension:** This addresses both the current and future impacts of the economy on the environment. It also includes key elements like sustainable economic growth, economic justice, and meeting basic needs.

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[4] Sayeh, B.*The Role of Good Governance in Achieving Sustainable Development in Arab Countries: The Case of Algeria*(Doctoral dissertation in Development Economics). Faculty of Economics, Business, and Management Sciences, University of Abou Bekr Belkaid – Tlemcen, pp. 66–77

[5] Farah, A. (2021).*An Analytical and Econometric Study of the Impact of Sustainable Development Indicators on Attracting Foreign Direct Investment in Algeria (1990–2019).Journal of Modern Economy and Sustainable Development*, Vol. 04, No. 01, June, p. 62.

[6] Brahim, K., & Rekima, S. (2007).*Disclosure of Social Responsibility*. In Proceedings of the Second International Scientific Conference: The Enterprise Between Economic Necessity and Environmental Challenges, Jijel, Algeria, p. 4.

[7] Nefadi, MS (2007).*Green Economy as a Mechanism of Sustainable Development to Attract Foreign Investment: A Field Study Applied to the Egyptian Context*.*Scientific Journal of the Faculties of Commerce Sector*, Al-Azhar University, Egypt, p. 5

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- **Social Dimension:** This emphasizes the responsibility of present generations to make growth choices that respect both their own needs and those of future generations. It involves factors such as equality in distribution, popular participation, cultural diversity, fairness, and justice in development decisions.

Goals of Sustainable Development

Sustainable development aims to achieve several objectives, which can be summarized as follows[8]:

- Increase in national income
- Improvement in the quality of life for people
- Reduction of income and wealth disparities
- Rational use of natural resources
- Linking modern technology to serve the goals of society

Econometric Study of the Impact of Sustainable Development on Economic Growth in Algeria

Variables and Study Model:

This study employs time series data analysis for Algeria, covering the period from 1990 to 2022. The data were collected from three sources: the World Bank database, the United Nations Development Program, and the Swiss Economic Institute[9]

The data were analyzed using the statistical software Reviews12.

We selected the GDP per capita as an indicator of economic growth. If a country shows a rising trend in GDP per capita over a specific period, we assume that its economy is growing.

The independent variables, representing sustainable development through its economic, social, and environmental dimensions, are presented in Table 1.

Table 1: Classification of Selected Sustainable Development Indicators

Sub-indicators	Sustainable development indicators
Economic Globalization Index Gross fixed capital formation	Economic dimension
Human Development Index Average age at birth	social dimension
carbon dioxide emissions per capita	Environmental dimension

The model can be formulated as follows:

$$GDPPC = \alpha + B_1 KOFE + B_2 GCF + B_3 HDI + B_4 LEXP + B_5 CO2PC$$

[8] Mansour, M. (2019/2020).*The Reality and Prospects of Sustainable Development in Algeria: An Analytical Study Using Statistical Indicators*(Doctoral dissertation). Faculty of Economics, Business and Management Sciences, University of August 20, 1955 – Skikda, p. 25..

[9] Gygli, S., Haelg, F., Potrafke, N., & Sturm, J. E. (2019).*The KOF Globalisation Index – Revisited*.*Review of International Organizations*, 14, 543–574. https://doi.org/10.1007/s11558-019-09344-2

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Whereas:

GDPPC: Gross Domestic Product per capita.

KOFE: Economic Globalization Index.

GCF: Gross fixed capital formation as a percentage of GDP.

HDI: Human Development Index.

EXP: Life expectancy at birth.

CO2PC: Carbon dioxide emissions per capita.

$B_1 B_2, B_3, B_4, B_5$: Represents the model's parameters.

α:Constant of the function.

After introducing the natural logarithm to the equation, we get:

$$LnGDPPC = Ln\alpha + B_1 LnKOFE + B_2 LnGCF + B_3 LnHDI + B_4 LnLEXP + B_5 LnCO2PC$$

Adopted Methodology

In practice, the ARDL models developed by Pesaran et al. (2001) are considered among the most effective dynamic models for analyzing both long-term and short-term relationships between study variables. These models account for an adequate number of lag periods, which helps in generating the most reliable set of data.

One of the main advantages of ARDL models is that they do not require all variables to be integrated of the same order. The variables can be integrated of order zero I(0), order one I(1), or a combination of both. Additionally, ARDL models allow for the estimation of both short-run and long-run parameters using a single equation, unlike other dynamic models. (Pesaran, 2001)

Accordingly, the ARDL model that estimates the impact of sustainable development indicators on economic growth in Algeria can be formulated as follows:

$$\begin{aligned}\Delta Ln\ GDPPC_t = {} & c + B_1 Ln\ GDPPC_{t-1} + B_2 Ln\ KOFE_{t-1} + B_3 Ln\ GCF_{t-1} + B_4 Ln\ HDI_{t-1} + B_5 Ln\ LEXP_{t-1} \\ & + B_6 Ln\ CO2PC_{t-1} + \sum_{i=0}^{q} \mu_{1,i} \Delta Ln\ GDPPC_{t-1} + \sum_{i=0}^{P_1} \mu_{1,i} \Delta Ln\ KOFE_{t-1} \\ & + \sum_{i=0}^{P_2} \mu_{2,i} \Delta Ln\ GCF_{t-1} + \sum_{i=0}^{P_3} \mu_{3,i} \Delta Ln\ HDI_{t-1} + \sum_{i=0}^{P_4} \mu_{4,i} \Delta Ln\ LEXP_{t-1} + \sum_{i=0}^{P_5} \mu_{5,i} \Delta Ln\ CO2PC_{t-1} + \varepsilon_t\end{aligned}$$

$$LnGDPPC = Ln\alpha + B_1 LnKOFE + B_2 LnGCF + B_3 LnHDI + B_4 LnLEXP + B_5 LnCO2PC$$

Whereas:

$B_6, B_5, B_4, B_3, B_2, B_1$:Represents the parameters of the long-term relationship,

$\mu_{5,i}, \mu_{4,i}, \mu_{3,i}, \mu_{2,i}, \mu_{1,i}$:Represents the parameters of the short-term relationship,

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P_5, P_4, P_3, P_2, P_1 , q :Represents the degree of slowing of the dependent variable and each of the independent variables, respectively,

C: Constant limit,

ε_tRandom error limit,

Δ:First class teams.

Testing the Stationarity of Time Series (Dickey–Fuller Unit Root Test)

To determine the stationarity of the time series for the model variables, the Augmented Dickey–Fuller (ADF) unit root test is applied, as shown in the following table:

Table (01): Results of the Augmented Dickey–Fuller (ADF) Test for Stationarity

First difference		Level		Variables	
C	T and C	C	T and C		
-5.1544	-5.0500	-0.4861	-1.9505	Ln GDPPC	
-4.9298	-6.1084	-2.9374	-2.5516	Ln KOFE	
-5.0062	-4.9355	-1.3849	-1.5372	Ln GCF	
-5.0123	-4.9556	-0.8266	-3.0738	Ln LEXP	
-4.6256	-5.0395	-1.4907	-0.3253	Ln HDI	
-5.76 34	-6.0383	-0.6506	-1.7569	Ln CO2PC	
-3.6616	-4.2967	-3.6537	-4.2732	1%	critical value
-2.9604	-3.5683	-2.9571	-3.5577	5%	
-2.6191	-3.2183	-2.6174	-3.2123	10%	

Source: Prepared by the researchers using EViews 12 software.

Based on the results of the unit root tests using the ADF method, it was found that all variables are non-stationary at level, but become stationary at the first difference. This integration is statistically significant at all levels of significance: 1%, 5%, and 10%. These results allow for the application of the ARDL methodology.

Third: Testing the Optimal Model

After determining the order of integration of the study variables and confirming that none are integrated of order two, the next step is to identify the optimal lag length. This is done using the Akaike Information Criterion (AIC), with the maximum lag set to 2, within the general ARDL model framework.

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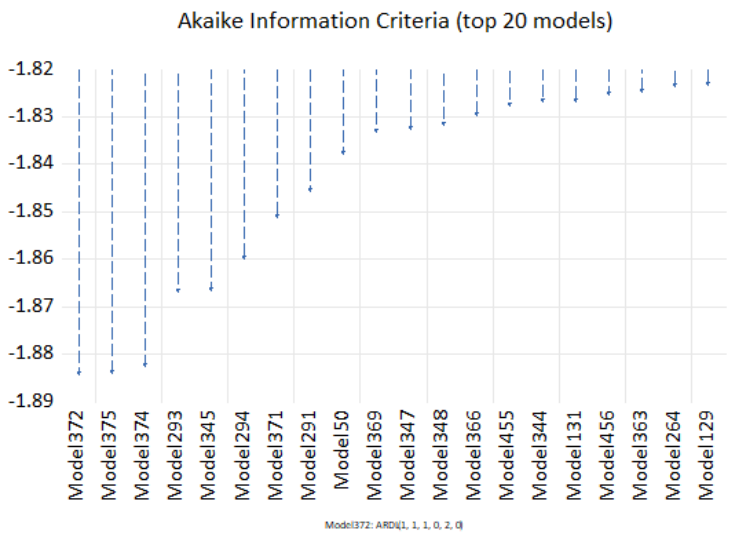
Figure (01): Optimal Lag Length for the ARDL Model



Source: Generated using EViews 12 software.

From Figure (01), it is clear that the model ARDL(1, 1, 1, 0, 2, 0) was selected as the best evaluated model. Based on this model, the bounds testing procedure will be conducted.

Cointegration Test (F-Bounds Test)

To verify the existence of a long-run relationship within the framework of the Unrestricted Error Correction Model (UECM), Pesaran et al. (2001) proposed a modern approach known as Bounds Testing. This method is used to test for long-run equilibrium relationships.

The results of the bounds test for each model are presented in the following table:

Table (02): Bounds Test Results

ARDL Bounds Test Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	3.9001	5
Critical value limits Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73

Source: Prepared by the researcher using EViews 12 software.

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Based on the results of the cointegration test, it is evident that the calculated F-statistic = 3.90 is greater than the upper critical value at the 5% significance level. This leads us to reject the null hypothesis, which states that there is no cointegration, and accept the alternative hypothesis, which suggests the existence of a long-run equilibrium relationship between the study variables.

Estimation of Long-Run Coefficients

Based on the results confirming the presence of a long-run relationship, we obtained the following values:

Table (03): Long-Run Coefficient Estimates

Long Run Coefficients				
	Coefficient	**Std. Error**	**t-Statistic**	**Prob**
Ln KOFE	-1.884315	4.021155	-0.468600	0.6444
Ln GCF	-0.029002	1.896947	-0.015289	0.9880
Ln LEXP	67.45521	67.36355	1.001361	0.3286
Ln HDI	-112.7800	121.2389	-0.930230	0.3633
Ln CO2PC	-1.374993	1.624752	-0.846279	0.4074
C	523.8343	556.4051	0.941462	0.3577

Source: Prepared by the researcher using EViews 12 software

he results presented in Table 3 show the sustainable development indicators that influence Algeria's economic growth in the long run. It is observed that life expectancy at birth has the highest positive coefficient and is strongly associated with GDP growth. Life expectancy is often considered a measure of a country's social, health, and economic progress.

However, the remaining variables — globalization index, gross fixed capital formation, human development index, and CO_2 emissions — are found to have a negative relationship with economic growth.

In particular, the long-term effects of globalization on economic growth in Algeria are negative. An increase of one percentage point in the globalization index leads to a decline in economic growth by 1.88%.

The relationship between (M2/M1) and GDP per capita indicates that financial innovation within Algeria's financial system can have a positive impact on sustainable economic growth in the long term.

Estimating the Error Correction Model (ECM) for the ARDL Approach

After confirming the existence of a long-term equilibrium relationship through the bounds test, it is necessary to estimate the short-run parameters and the error correction term (ECM).

Table (04): Results of the Error Correction Model Estimation

variable	coefficient	Std.Error	T.Statistic	Prob.
D (LNKOFE)	-0.886133	0.298474	-2.968875	0.0076
D (LNGFC)	-0.566128	0.132349	-4.277527	0.0004

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D (LNLEXP)	-2.494318	2.025602	-1.231396	0.2325
D (LNLEXP(-1))	3.647302	1.499403	2.432502	0.0245
CointEq (-1)*	-0.106031	0.017798	-5.957443	0.0000
Statistical indicators				
R-Squared	AdjR-Squared	SE Regression	DW	
0.6930	0.6457	0.0722	1.92	

Source: Prepared by the researcher using EViews 12 software.

The results of the Error Correction Model estimation indicate that the error correction term is statistically significant at the 5% level. Its negative sign supports the validity and accuracy of the long-run equilibrium relationship. This confirms the presence of a correction mechanism that reflects the speed at which the system returns to equilibrium in the long run.

The coefficient of the error correction term is -0.1060. This means that any short-run deviation from equilibrium is adjusted toward long-term stability at a rate of 0.106% per year, on average.

Diagnostic Tests (Model Validity Tests):

First: Testing for autocorrelation in the residential areas

To check for autocorrelation in the model's residuals, the**Breusch-Godfrey Serial Correlation LM Test**is applied.

Table (05): Results of the Breusch-Godfrey Serial Correlation Test

Autocorrelation test of residuals Breusch-Godfrey Serial Correlation LM Test			
F–Statistic	2.330125	Prob. F(2,18)	0.1259
Obs* R – Squared	6.375382	Prob. Chi-Squar (2)	0.0413

Source: Prepared by the researcher using EViews 12 software.

From the table, it is observed that the calculated Fisher statistic for the serial correlation test of the residuals is (2.330125), with a p-value of 0.1259. Since this value is greater than 5%, we accept the null hypothesis, which states that there is no serial correlation in the residuals, and reject the alternative hypothesis.

Second: Heteroskedasticity Test

Table results show that the calculated Fisher statistic for the Autoregressive Conditional Heteroskedasticity (ARCH) test is (0.511902), with a p-value of 0.8619. As this value exceeds 5%, the null hypothesis — which assumes homoskedasticity — is accepted, and the alternative hypothesis is rejected.

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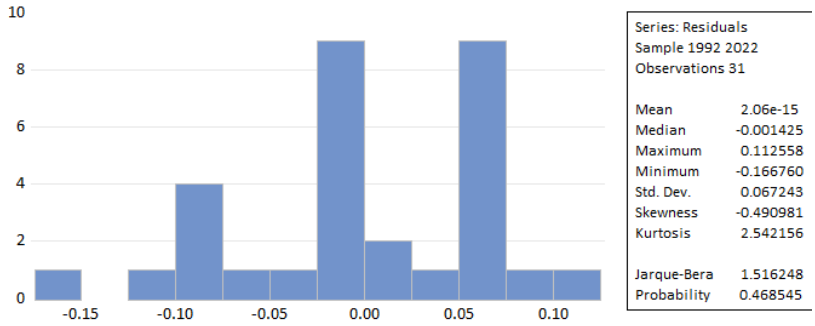
Table (06): Results of the Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F - Statistic	0.511902	Prob.F (10 ; 20)	0.8619
Obs* R - Squared	6.317506	Prob.Chi-Square (13)	0.7879
Scaled explained SS	2.027592	Prob.Chi-Square (13)	0.9961

Source: Prepared by the researcher using EViews 12 software.

Third: Normality Test of the Residents

Figure (02): Results of the Residents' Normality Test



Source: Output from EViews 12 Software

To verify the normality of the residuals, the**Jarque-Bera test**is used. The results shown in the figure above indicate acceptance of the null hypothesis, which states that the residuals are normally distributed.

Fourth: Model Stability Test

To ensure that the data used in the study are free from structural changes, it is necessary to apply appropriate tests. Among the most commonly used are the **Cumulative Sum (CUSUM)** test and the**Cumulative Sum of Squares (CUSUMQ)** test. test. These tests are important as they detect any structural shifts in the data and assess the consistency and stability of the long-run and short-run parameters.

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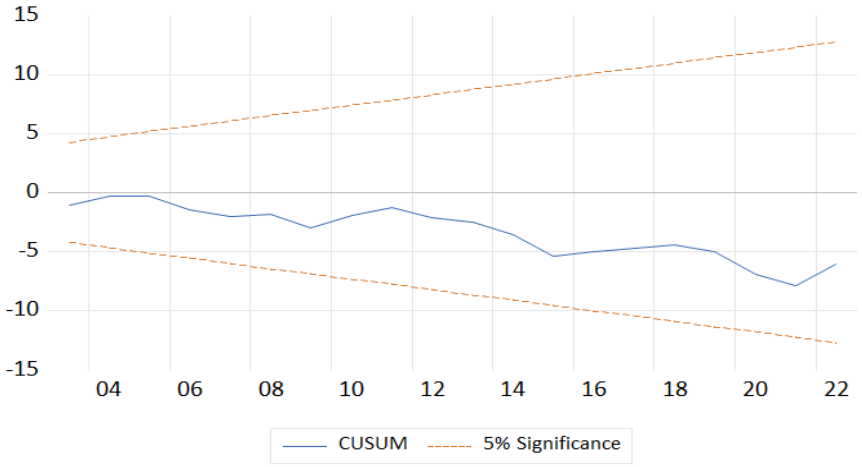
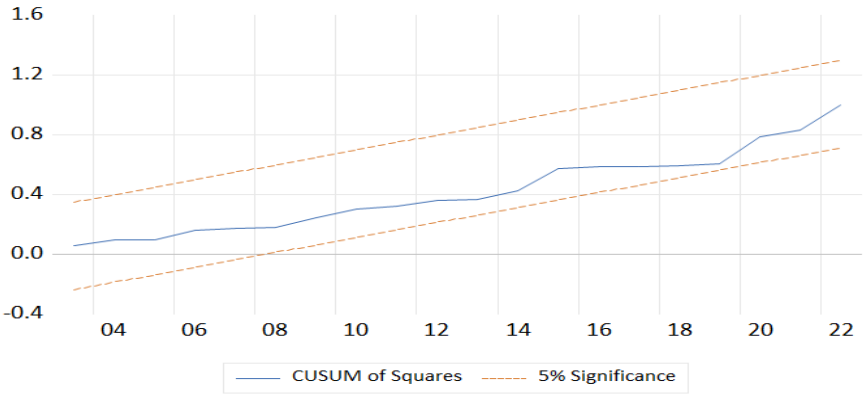
Figure (03): CUSUM Test



Source: Output from EViews 12 Software.

Figure (04): CUSUMQ Test



Source: Output from EViews 12 Software.

Based on the two figures above, and since both curves fall within the critical bounds at the 5% significance level, it can be concluded that both the long-run and short-run models do not show any structural change.

Conclusion:

The study of the reciprocal relationship between sustainable development and economic growth is highly important. It helps in understanding how each factor affects the other.

In this study, we used time series data related to Algeria during the period 1990–2022. The data were collected from the World Bank database, the United Nations Development Program, and the Swiss Economic Institute. The analysis was conducted using the EViews 12 statistical software.

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The study used **GDP per capita** as an indicator of economic growth. When any country shows an upward trend in GDP per capita over a certain period, we assume that the economy is growing. As for the independent variables representing sustainable development in its three dimensions—economic, social, and environmental—we relied on the **economic globalization index**and**gross fixed capital formation** for the economic dimension. For the social dimension, we used the **Human Development In dex**and **life expectancy at birth** The .**CO_2 emissions per capita**index was used to represent the environmental dimension.

To ensure the best estimation for the data, we applied the **ARDL model**, which is suitable for distinguishing between dependent and explanatory variables and helps to resolve issues such as autocorrelation and endogeneity. The ARDL model can estimate both short-run and long-run relationships at the same time. It also provides unbiased and efficient results. The ARDL framework is particularly useful when built around a single-equation structure.

In many time series models, there is often a relatively long period between a decision-making variable and the final effect on a policy variable. This means that the effect of changes in the explanatory variable **X** on the dependent variable **Y** is distributed over time. Therefore, when the response time is relatively long, lagged explanatory variables should be included in the model. One common way to construct dynamic response models is to include lagged values of **X** as explanatory variables. This approach ensures a proper adjustment process using a simple model that includes a series of lagged explanatory variables.

After estimating the model, the study reached results that clarify the sustainable development indicators influencing Algeria's economic growth in the long term. It was found that **life expectancy at birth** has the highest positive coefficient and is strongly correlated with GDP growth. Life expectancy is often seen as a measure of a country's social, health, and economic development.

However, the remaining variables showed a **negative relationship** with economic growth. The long-term effect of globalization on Algeria's economic growth was found to be **negative** whereas **financial innovation** in the Algerian financial system is expected to have apositiveimpact on sustainable economic growth in the long run.

8. Appendices:

Appendix No. 02: Results of the Bounds Test based on the ARDL Approach

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	3.900123	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Output from EViews 12 Software.

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Appendix 03: Estimation of Long-Run Coefficients

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNKOFE	-1.884315	4.021155	-0.468600	0.6444
LNGFC	-0.029002	1.896947	-0.015289	0.9880
LNHDI	67.45521	67.36355	1.001361	0.3286
LNLEXP	-112.7800	121.2389	-0.930230	0.3633
LNCO2PC	-1.374993	1.624752	-0.846279	0.4074
C	523.8343	556.4051	0.941462	0.3577

EC = LNGDPPC - (-1.8843*LNKOFE -0.0290*LNGFC + 67.4552*LNHDI
-112.7800*LNLEXP -1.3750*LNCO2PC + 523.8343)

Source: Output from EViews 12 Software.

Appendix No. 04: Error Correction Model (ECM)

ARDL Error Correction Regression
Dependent Variable: D(LNGDPPC)
Selected Model: ARDL(1, 1, 1, 0, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 09/29/25 Time: 13:51
Sample: 1990 2022
Included observations: 31

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNKOFE)	-0.886133	0.298474	-2.968875	0.0076
D(LNGFC)	-0.566128	0.132349	-4.277527	0.0004
D(LNLEXP)	-2.494318	2.025602	-1.231396	0.2325
D(LNLEXP(-1))	3.647302	1.499403	2.432502	0.0245
CointEq(-1)*	-0.106031	0.017798	-5.957443	0.0000

R-squared	0.693010	Mean dependent var	0.033449
Adjusted R-squared	0.645781	S.D. dependent var	0.121363
S.E. of regression	0.072231	Akaike info criterion	-2.271211
Sum squared resid	0.135649	Schwarz criterion	-2.039923
Log likelihood	40.20378	Hannan-Quinn criter.	-2.195817
Durbin-Watson stat	1.929873		

* p-value incompatible with t-Bounds distribution.

Source: Output from EViews 12 Software.

Appendix No. 05: Results of the Residual Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.330125	Prob. F(2,18)	0.1259
Obs*R-squared	6.375382	Prob. Chi-Square(2)	0.0413

Source: Output from EViews 12 Software.

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Appendix No. 06: Results of the Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.511902	Prob. F(10,20)	0.8619
Obs*R-squared	6.317506	Prob. Chi-Square(10)	0.7879
Scaled explained SS	2.027592	Prob. Chi-Square(10)	0.9961

SOURCE: OUTPUT FROM EVIEWS 12 SOFTWARE.

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