

The Impact of Saving on Economic Growth in Algeria during the Period 1990/2022 Using Distributed-Lag Autoregressive Models (ARDL)

أثر الادخار على النمو الاقتصادي في الجزائر خلال الفترة 1990/2022 باستخدام نماذج الانحدار الذاتي للفجوات الزمنية الموزعة والمتباطئة (ARDL)

Guenouna Lakhdar ¹

¹ Maître de conférences classe B, University Center of Tipaza,

guenouna.lakhdar@cu-tipaza.dz

Received: 04-07-2024

Accepted: 01-10-2024

Abstract:

This study aims to examine and highlight the relationship between savings and economic growth during the period from 1990 to 2022, To clarify this relationship, we use the Autoregressive Distributed Lag (ARDL) model, The most significant finding of the study is the existence of a long-term equilibrium relationship between savings and economic growth, additionally, savings have a positive impact on gross domestic product (GDP) in the short term, and its coefficient is statistically significant, which aligns with economic theory, specifically, a 1% increase in savings leads to a 0.28% increase in economic growth, and There is also a short-term dynamic relationship between savings and economic growth, with savings positively affecting growth in the short term, The coefficient is statistically significant, confirming that a 1% increase in savings results in a 0.68% increase in economic growth, This underscores the importance of savings in driving economic growth.

Keywords: Savings, Growth, Algeria, ARDL model

JELClassificationCodes: A10, A11, D2, E2, E6, E7, G3, G5.

ملخص:

تهدف هذه الدراسة الى اختبار وإبراز العلاقة بين الادخار والنمو الاقتصادي، وذلك خلال الفترة 1990 الى 2022، ومن أجل توضيح هذه العلاقة نستعمل نموذج الانحدار الذاتي للفجوات المتباطئة الموزعة المبطة *ARDL*، وأهم ما توصلت إليه الدراسة هو وجود علاقة توازنه طويلة الأجل بين الادخار والنمو الاقتصادي، بالإضافة الى أن الادخار يؤثر طرديا على الناتج الداخلي الخام في الأجل القصير، كما أن معلمته ذات دلالة إحصائية، وهو ما يتوافق والنظرية الاقتصادية، حيث كلما ارتفع الادخار بـ 1% ارتفع النمو الاقتصادي بـ 0.28%، وهناك علاقة ديناميكية قصيرة الأجل بين الادخار والنمو الاقتصادي من جهة، والادخار يؤثر طرديا على النمو في الأجل القصير من جهة أخرى، كما أن معلمته ذات دلالة إحصائية، وهو ما يتوافق والنظرية الاقتصادية، حيث كلما ارتفع الادخار بـ 1% ارتفع النمو الاقتصادي بـ 0.68%، وهذا ما يؤكد على أهمية الادخار في دعم عجلة النمو الاقتصادي.

كلمات مفتاحية: ادخار، نمو، الجزائر، نموذج *ARDL*.

تصنيفات JEL: A10, A11, D2, E2, E6, E7, G3, G5

Corresponding author: Guenouna lakhdar, *e-mail:* guenouna.lakhdar@cu-tipaza.dz

1. INTRODUCTION

Savings is considered one of the fundamental factors affecting economic activity in general and economic growth in particular, Savings can contribute to increasing internal financing for investments and providing the necessary resources to stimulate economic development in Algeria, which has undergone significant economic transformations during the period from 1990 to 2024, Understanding the impact of savings on economic growth is crucial for driving the economy forward, assessing the country's economic performance, and determining future economic policies, Given the important role of savings, the main research question can be formulated as follows: **What is the impact of savings on economic growth in Algeria during the period 1990/2022?**

To address this question, the following hypothesis is proposed: Changes in savings have a positive impact on economic growth in Algeria.

This study aims to understand and measure the impact of savings on economic growth in Algeria during the period 1990 to 2022 by attempting to build an econometric model that explains the effect of savings on the dependent variable (economic growth) and measure the degree of its impact.

Given the importance of savings as a fundamental element of financing for increasing economic activity, and considering the significant economic transformations that the national economy has experienced, savings is considered the primary source for capital formation, It is the driving force of the economy, converting saved funds into investments in new projects, infrastructure building, and developing modern technologies that contribute to increasing productivity and improving overall economic performance, additionally, savings is an essential source for financing local and foreign investments, thereby stimulating economic growth and creating new job opportunities, when individuals and institutions save a portion of their income, these funds become available to investors to finance their projects, whether industrial, commercial, or service-related, Savings also enhances the country's economic stability by reducing dependence on external financing, when the savings rate is high, it means the country relies on its internal savings to finance its investment needs, making it less vulnerable to global financial market fluctuations.

Savings is essential for achieving long-term economic growth, when individuals and institutions increase their savings, they contribute to financing long-term return investments and projects, saving funds are a crucial source for financing small and medium-sized enterprises, which are key drivers of economic growth, thus improving productivity and achieving sustainable economic growth, sustainable economic growth resulting from savings improves individuals' living standards, As productivity increases and job opportunities become available, individual income rises, allowing people to meet their basic needs and reach a better living standard.

This study relies on the quantitative method using statistical and econometric tools, aiming to measure the impact of savings on economic

growth in Algeria according to the ARDL model, using the EVIEWS 12 software.

Previous studies include:

- **Study by Artur Ribaj and Fitim Mexhuani (2021, Kosovo):** This study provides deeper insights into this relationship by examining the case of Kosovo using qualitative and quantitative research methodologies, The analyzed data covers the period from 2010 to 2017, evaluated using augmented Dickey-Fuller tests, Johansen co-integration tests, and Granger causality tests, the unit root test confirmed data stability, and regression results showed that deposits have a significant positive impact on economic growth in Kosovo, savings stimulate investment, production, and employment, resulting in greater and more sustainable economic growth, The study also found that loans and financial transfers help stimulate Kosovo's economy through their direct impact on investment. (Ribaj & Mexhuani , 2021)

- **Study by Orji Anthony (2012, Nigeria):** This study examined the determinants of banking savings in Nigeria and their impact on the country's economic growth during the period from 1970 to 2006, two models were used: the Distributed Lag Error Correction Model (DL-ECM) and the distributed lag model, the results showed several factors influencing domestic private savings, including individual GDP values (PCY), financial depth (FSD), interest rate gap (IRS), which had a positive impact, while the real interest rate (RIR) and inflation rate (INFR) had a negative impact.

There was also a positive relationship between lagged values of gross private savings, credit to the private sector, credit to the public sector, interest rate gaps, exchange rates, and economic growth. (Orji , 2013)

- **Study by Ali Salem Ali Al-Hussainan (2021, Kuwait):** This study aimed to investigate the impact of savings and investment on economic growth in Kuwait, where local and foreign investments are the key means of financing development programs, The study's question revolves around the existence of a statistically significant relationship between savings, investment, and economic growth in Kuwait, The study highlights the prominent role of savings and investment in the economic development process, Higher

savings rates lead to increased investment rates, reflecting an increase in production capacity and continuous economic development, The study confirmed the existence of a relationship between savings, investment, and economic growth in Kuwait. (Salem & Al-Husseinan, 2021)

• **Study by Mohamed Ahmed Al-Motayem and Amani Salah Mahmoud Al-Makhzangi (2020, Egypt):** This study aimed to show the impact of domestic savings on economic growth in Egypt, The econometric study found that domestic savings in Egypt during the period (1990 - 2017) had a significant impact on economic growth in both the short and long term, Generally, there is a statistically significant positive relationship between domestic savings and economic growth in Egypt in the long term, with a significance level of 1%, where the determination coefficient was 97.7%. The results also showed a positive relationship between the two variables in the short term at a significance level of 5%. (Al-Mutaim & Mahmoud Al, 2020)

• **Study by Mouloud Kebir (2017, Algeria):** This study aimed to highlight the interaction between domestic savings and economic growth in some countries during the period 1970-2012 and attempted to model the studied phenomenon, The study concluded that the savings rate significantly impacts economic growth in the sample countries and that there is a long-term relationship between domestic savings and economic growth in the sample countries, Economic growth and domestic savings are positively and strongly affected by the share and per capita income in the long term. (Kebir, 2016)

2. Basic Concepts of Savings: The concepts of savings have evolved with the development of economic thought, resulting from the diversity and differences in economic ideas.

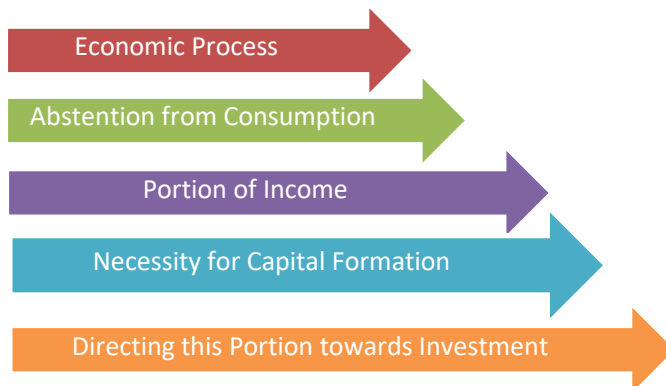
2.1. Definition of Savings

- Defined as the portion of income that is not consumed; (Christian , 2004, p. 52)
- Defined as allocating a portion of income now and not consuming it, for later use; (Gardio, 2004, p. 03)
- Also defined as the part of income that is not dedicated to consumption during a specific period; (Llmane, 2009, p. 367)

- Additionally, defined in the current sense as forming a reserve; (Llmane, 2009, p. 367)
- According to Keynes, it is the remainder of income after consumption; (Hachette, 2013, p. 594)
- Savings is the portion of current income not directly used for current consumption during a specific period; (Guyots, 1979, p. 47)
- Also defined as the portion of current income not directly used for current consumption. (Guyots, 1979, p. 47)

Through these definitions, the main aspects of defining savings can be identified as:

Figure 1: Main Aspects of Defining Savings



Source: Prepared by the researcher based on the aforementioned definitions

2.2. Concept of Saving in Classical and Keynesian Schools:

Contrast in the concept of saving between the Classical and Keynesian schools:

2.2.1. Saving in the Classical School:

The concept of saving differed among classical economists compared to modern ones, Classical theory considered saving as synonymous with investment, based on the principle that all savings are invested, (Hamdi , 1971, p. 107) According to them, individuals act rationally and only save when they anticipate a return, often in the form of stocks or bonds, Thus, classical economists recognized only positive saving, where saving is a

decreasing function of the real interest rate, formulated as follows: (Hamdi , 1971, p. 107)

$$S = f(i)$$

Where: *i* is the interest rate and *S* represents saving.

2.2.2. Saving in Keynesian Theory

Keynes criticized the classical view that all savings automatically translate into investment, seeing this as a confusion between saving and investment, He defined saving as the decision not to consume income, which may not necessarily translate into investment due to liquidity preference, Keynes distinguished between positive saving (which is invested) and negative saving (which is hoarded, meaning income not spent on capital markets) , He formulated this relationship as: (John Maynard , 1990, p. 83)

$$S = Y - C$$

Where: *S* is saving, *Y* is income, and *C* is consumption.

2.3 Types and Sources of Saving

Saving can be viewed from several perspectives:

2.3.1. Types of Saving by the Saver's Entity

Three types of saving are distinguished Kornai:

- Individual Saving: Done by individuals when their income exceeds their consumption, this surplus is directed towards savings, such as depositing in savings accounts, buying insurance policies, time deposits in banks, or purchasing securities.
- Corporate Saving: Savings deducted from corporate profits for future investment opportunities, also known as reinvestment of profits.
- Government Saving: surplus government income (revenue from taxes and fees) over government spending on consumption.

2.3.2. Types of Saving by Nature of Savings:

- There are two types based on the nature of savings:
 -  **Voluntary Saving**: Done voluntarily by households and projects.
 - Household Savings: Includes savings balances in banks, savings funds, investments in bonds, investment certificates (Tadros Quraydah,

Introduction to Economics, 1981, p. 461), life insurance policies, real estate debts, and liquid cash assets like cash and bills. (Hamdan , 1971, p. 138)

-Business Sector Savings: Depend on the importance of this sector in economic activity, with profits withheld in private institutions and companies being crucial national saving sources in advanced countries. (Tadros, 1981, p. 465)

- Private Sector Savings: Undistributed profits held by private establishments and companies constitute the most important sources of national savings in advanced countries, The volume of these savings depends on the level of profits earned and the policy for distributing these profits, Increased profits and increased financial reserves for future expansions enhance private sector savings. (Hamdan, Issues of Economic Development Financing in Underdeveloped Countries, 1971, p. 138)
- Public Sector Savings: In addition to private sector savings, profits generated from government-owned projects are another source of national savings, These governmental savings can be increased by rationalizing government spending and enhancing productivity, which requires a clear economic policy linking wages, productivity, commodity prices, and services. (Tadros Quraydah, Introduction to Economics, 1981, p. 465)

-Savings in the form of time deposits in banks: Government sector savings consist of profits generated from state-owned projects, which can be increased by improving productivity efficiency and rationalizing government spending, This requires clear economic policies that regulate the relationship between wages, productivity, and prices (Tadros, 1981, p. 461).

 **Compulsory Savings:** Compulsory savings refer to the deduction of a portion of income (Tadros, 1981, p. 461), either for the benefit of the saver or for the state, It includes government savings, social insurance and pensions, and monetary inflation. (Kornai , 1984 , p. 66)

-Government Savings: Government savings, or budget surplus, represent the difference between current revenues and expenditures. (Ajamia & Nasif, 2008, p. 248)

-Social Insurance and Pensions: Savings from social insurance funds are an important source of national savings, These savings are formed from mandatory deductions from salaries and wages of government and public sector workers, This type of savings provides direct benefits to contributors such as health coverage and retirement pensions, contributing to social stability and ensuring individuals' rights, (Hussein , 1994, p. 182) Therefore, it is more widely accepted by individuals and organizations compared to other types of compulsory savings. (Tadros Quraydah, Introduction to Economics, 1981, p. 473)

-Monetary Inflation: Monetary inflation serves as a source of compulsory savings to finance national economic development when other resources are insufficient. In such cases, the government resorts to spending new purchasing power borrowed from the banking system to cover budget deficits, This inflationary spending often leads to higher price levels at a faster rate than increases in cash incomes, reducing real incomes for individuals with fixed incomes Consequently, these individuals are compelled to reduce their consumption or establish real compulsory savings. (Ajamia & Al-Labthi,, Economic Development, 2003, p. 256)

2.3.3. Saving by Efficiency:

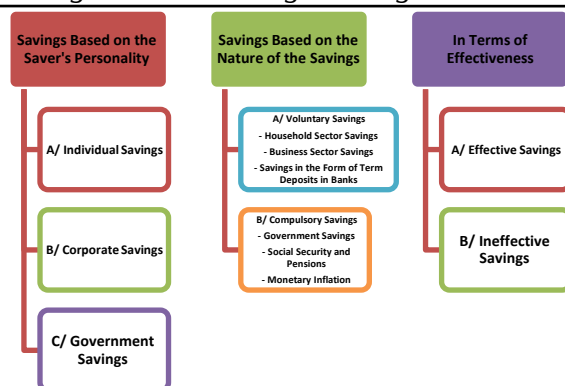
There are effective and ineffective savings:

- **Effective Saving:** Directed towards investment in increasing production, contributing effectively to societal development, Increased production leads to higher exports, increasing income and improving living standards, crucial steps towards sustainable development.

- **Ineffective Saving:** Savings hoarded without investment or production, known as hoarding, which hinders economic wealth and is undesirable due to its negative economic impacts. (Kebir, 2016, p. 15)

Figure 2: Types of Savings and Their Sources

The Impact of Saving on Economic Growth in Algeria during the Period 1990/2022 Using Distributed-Lag Autoregressive Models (ARDL)



Source: Prepared by the researcher based on the previous literature

2.4 Importance of Savings for Achieving Growth:

Savings are considered a significant and effective source for financing investment. Increasing savings rates is among the foremost requirements for improving economic activity as a factor in enhancing economic performance and consequently boosting economic growth for countries. This increase in savings rates is linked to the extent of commitment by countries. (Kebir, 2016, p. 15)

3. Measuring the Impact of Savings on Economic Growth in Algeria:

Based on the aforementioned, we will attempt to construct a standard model that reflects the long and short-term relationship between savings and economic growth in Algeria during the period 1990-2022.

3.1 Preliminary Tests:

We will first present the general formulation of the model, followed by distributing lag periods for model variables based on the Akaike Information Criterion (AIC). Then, we will proceed to examine stability.

3.1.1 Model Construction:

The economic explanatory factors under study require a period to influence the dependent variable distributed between short and long terms. Thus, the ARDL test can be applied, and the model of the study is written in the following format:

$$\Delta LGDP_t = \beta_0 + \sum_{i=1}^p \beta_1 \Delta LGDP_{t-i} + \sum_{t=0}^q \beta_2 \Delta LSAV_{t-i} + \alpha_1 LGDP_{t-1} + \alpha_2 LSAV_{t-1} + \varepsilon_t$$

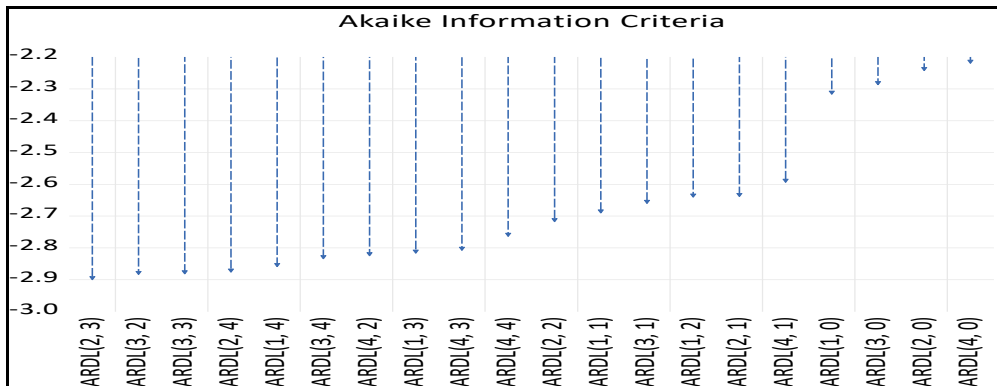
Where:

- LGDP: Natural logarithm of Gross Domestic Product (GDP);
- LSAV: Natural logarithm of Savings;
- Δ : First-difference operator;
- p, m: Maximum lag lengths for the dependent and independent variables in the model;
- β (0-3): Short-term relationship coefficients (Error Correction Model);
- α (1-3): Long-term relationship coefficients.

3.1.2 Optimal Lag Selection for the Model:

Based on Figure of the model of the study, which illustrates the total possible models when changing the lag degrees of the model variables, after selecting degree (1) according to the Schwarz Information Criterion (SIC), it is evident that the (2,3) ARDL model is optimal and has the lowest value according to the Akaike Information Criterion (AIC). In this model, the variable LGDP is lagged by two periods, and the independent variable LSAV is lagged by three periods, as shown in the following figure:

Figure 3: Results of Optimal Lag Length Tests



Source: Eviews 12 Outputs

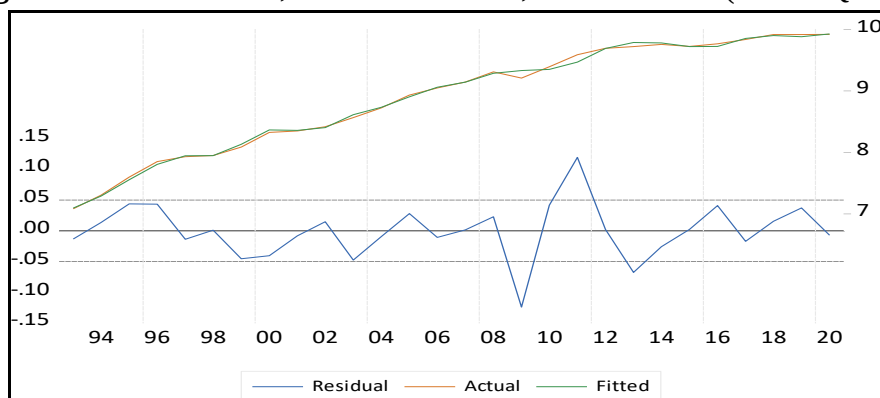
3.2 Model Quality Test (Residuals Diagnosis)

Before adopting the (2,3) ARDL model to estimate short-term and long-term effects, it is important to ensure the model's performance quality using the following tests:

3.2.1. Model Quality

To assess the model's quality, it is necessary to compare actual values with estimated values as shown in the following figure:

Figure 4: Actual Values, Estimated Values, and Residuals (Model Quality)



Source: Eviews 12 Outputs

Based on the figure, we observe that the estimated values closely approximate the actual values, indicating the reliability of the model. Therefore, it can be relied upon for interpreting and analyzing the results.

.2.2 Normality Distribution of Residuals

The nature of residual distribution is assessed through the hypothesis test stating residuals are normally distributed. This is examined by observing if residuals cluster around the center and decrease towards the extremes, or fail to cluster around the center. It is also assessed statistically using the Jarque-Bera test against the critical Chi-Square value at 2 degrees of freedom and a significance level of 0.05. The null and alternative hypotheses are formulated as follows:

(H₀): The residuals are normally distributed.

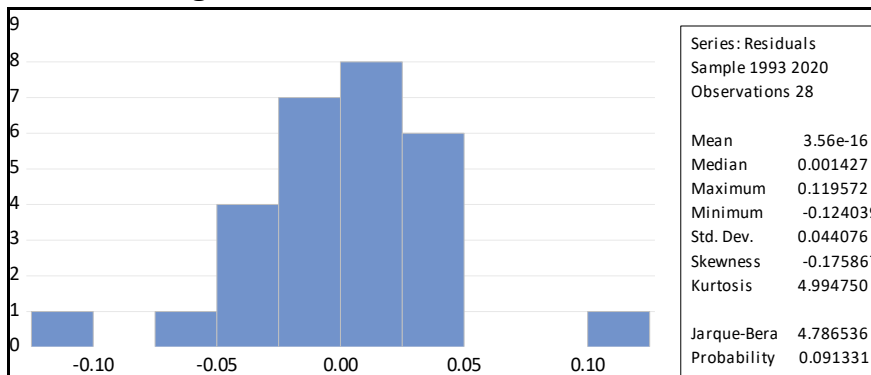
(H₁): The residuals are not normally distributed.

To test the hypothesis at a significance level (α) of 5%, you compare the Jarque-Bera statistic JB with the chi-square (χ^2) distribution with 2 degrees of freedom (because the Jarque-Bera test statistic asymptotically follows a chi-square distribution with 2 degrees of freedom under the null hypothesis):

- Calculate the critical value of the chi-square distribution with 2 degrees of freedom at $\alpha = 0.05$ (or use a chi-square table).
- If $JB > \text{critical value}$, reject H_0 (residuals are not normal).
- If $JB \leq \text{critical value}$, do not reject H_0 (evidence is not sufficient to conclude that residuals are not normal).

Based on Figure 3, we observe that the test result was not significant ($\alpha > 0.05$), indicating that the residuals follow a normal distribution. This is supported by the Jarque-Bera statistic value of 4.78, which is less than the critical Chi-Square value of 5.99. This confirms that the residuals of the model adhere to a normal distribution, as illustrated in the following figure.

Figure 5: Normal Distribution of Residuals



Source: Eviews 12 Outputs

3.2.3 Autocorrelation Test of Residuals

The absence of autocorrelation among the residuals is tested through the hypothesis stating "there is no autocorrelation among the residuals. This is done by statistically comparing the computed Lagrange Multiplier (LM) test statistic with the critical Chi-Square value at 2 degrees of freedom and a

*The Impact of Saving on Economic Growth in Algeria during the Period
1990/2022 Using Distributed-Lag Autoregressive Models (ARDL)*

significance level of 0.05. The null and alternative hypotheses are formulated as follows:

(H₀): The residuals are not autocorrelated (no serial correlation).

(H₁): The residuals are autocorrelated (serial correlation exists).

Under the null hypothesis, the LM statistic asymptotically follows a chi-square distribution with k degrees of freedom, where k is the number of lags included in the test.

- Calculate the critical value of the chi-square distribution at the 5% significance level (or use a chi-square table) with k degrees of freedom.
- If $LM > \text{critical value}$, reject H_0 (residuals are autocorrelated).
- If $LM \leq \text{critical value}$, do not reject H_0 (evidence is not sufficient to conclude that residuals are autocorrelated).

To ensure the absence of autocorrelation, we resort to autocorrelation tests, as illustrated in the following table:

Table 1: Results of Autocorrelation Test for Residuals

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 1 lag			
F-statistic	0.018868	Prob. F(1,20)	0.8921
Obs*R-squared	0.026391	Prob. Chi-Square(1)	0.8709
Test Equation: Dependent Variable: RESID Method: ARDL Date: 03/27/24 time: 20:10 Sample: 1993 2020 Included observations: 28 Presample missing value lagged residuals set to zero.			

Date: 03/27/24 Time: 20:10 Sample (adjusted): 1993 2020 Q-statistic probabilities adjusted for 2 dynamic regressors						
Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob*	
		1	0.022	0.022	0.0145	0.904
		2	-0.474	-0.475	7.2682	0.026
		3	-0.038	-0.016	7.3155	0.062
		4	0.056	-0.216	7.4269	0.115
		5	0.018	-0.007	7.4382	0.190
		6	0.108	0.052	7.8875	0.246
		7	-0.155	-0.215	8.8505	0.264
		8	-0.021	0.118	8.8697	0.353
		9	0.071	-0.150	9.0955	0.429
		10	0.052	0.146	9.2240	0.511
		11	-0.072	-0.161	9.4810	0.578
		12	-0.081	-0.022	9.8285	0.631
*Probabilities may not be valid for this equation specification.						

Source: Eviews 12 Outputs

From the table, we observe that all columns fall within the confidence interval, and the Q-Star test statistics are not significant. According to the LM test, the Prob chi-square is greater than 0.05, indicating that we accept the null hypothesis of no autocorrelation.

3.2.4 Heteroscedasticity Test (Time Stability)

Heteroscedasticity over time is tested by comparing the computed R-Square using the ARCH test statistic with the critical Chi-Square value at 2 degrees of freedom and a significance level of 0.05. The null and alternative hypotheses are formulated as follows: and the following table illustrates the heteroscedasticity test:

Table 2: Results of Heteroscedasticity Test

Heteroskedasticity Test: ARCH			
F-statistic	0.140278	Prob. F(1,25)	0.7112
Obs*R-squared	0.150655	Prob. Chi-Square(1)	0.6979
Test Equation: Dependent Variable: RESID^2 Method: Least Squares Date: 03/27/24 Time: 20:13 Sample (adjusted): 1994 2020 Included observations: 27 after adjustments			

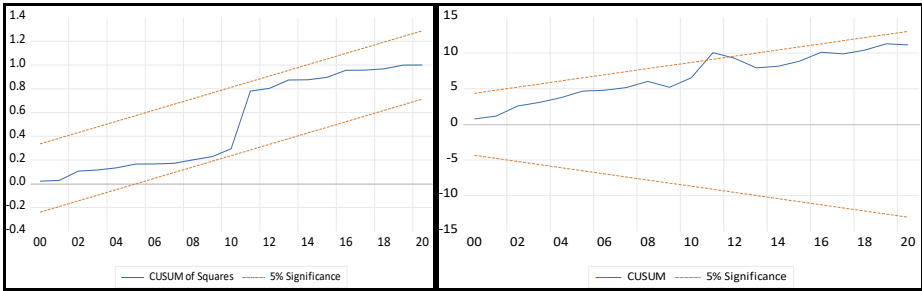
Source: EvIEWS 12 Outputs

According to this test, Prob F is greater than 0.05, indicating that F is not significant. Therefore, we accept the alternative hypothesis, which suggests heteroscedasticity.

3.2.5 Stationarity Test

To ensure that the data used do not exhibit any structural changes and that the model is suitable for prediction, it is essential to assess the stability of the model through graphical examination of the model residuals and their squares, as illustrated in the following figure:

Figure 6: Results of Model Stability Test



Source: EvIEWS 12 Outputs

Since the graphical representation in both the CUSUM Test and CUSUM of Squares Test falls within the critical bounds at the 0.05 level, we accept the model's stability.

3.3 Testing Model Parameters in Short and Long Terms

Here, we explore the possibility of co-integration between model variables and evaluate the impact of independent variables on economic growth in Algeria, both in the short and long terms.

3.3.1 Testing Co-integration Using the Bounds Approach (Bounds Test)

The potential for co-integration is examined through the hypothesis: there exists co-integration among model variables.

And the following table illustrates the results of the co-integration test using the Bounds Test methodology.

Table 3: Bounds Test Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic k	5.992124 1	10%	Asymptotic: n=1000	
		5%	3.02	3.51
		2.5%	3.62	4.16
		1%	4.18	4.79
			4.94	5.58
Actual Sample Size	28	10%	Finite Sample: n=35	
		5%	3.223	3.757
		1%	3.957	4.53
			5.763	6.48
		10%	Finite Sample: n=30	
		5%	3.303	3.797
		1%	4.09	4.663
			6.027	6.76

Source: Eviews 12 Outputs

The results indicate that the computed F-statistic value exceeds the critical values for both the lower and upper bounds at most levels of significance. Therefore, we reject the null hypothesis that suggests no co-integration relationship between the variables. This implies a long-term equilibrium relationship between savings and economic growth.

3.3.2 Analysis and Interpretation of Short-Term Relationship

Table 3 shows that:

Savings has a positive and statistically significant impact on Gross Domestic Product (GDP) in the short term, aligning with economic theory. For every 1% increase in savings, GDP increases by 0.28%. This percentage is relatively low compared to savings levels in Algeria, which are among the highest globally. However, due to weak government policies to encourage savings and deficiencies in the banking system, this impact remains constrained.

There is a short-term dynamic relationship between savings and economic growth, attributed to the negatively signed and statistically significant error term ($\text{CointEq}(-1) = -0.13$). This measures the degree of imbalance in the dependent variable that can be corrected from one time period to another. The negative sign supports the existence of a long-term equilibrium relationship between the variables.

Table 04: Results of Short-Term Parameter Estimates and Error Correction Term

*The Impact of Saving on Economic Growth in Algeria during the Period
1990/2022 Using Distributed-Lag Autoregressive Models (ARDL)*

ARDL Error Correction Regression Dependent Variable: D(LGDP) Selected Model: ARDL(2, 3) Case 2: Restricted Constant and No Trend Date: 03/27/24 Time: 20:19 Sample: 1990 2020 Included observations: 28				
ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LGDP(-1))	0.289372	0.126921	2.279949	0.0332
D(LSAV)	0.283613	0.050554	5.610048	0.0000
D(LSAV(-1))	-0.166213	0.062946	-2.640550	0.0153
D(LSAV(-2))	-0.146700	0.049263	-2.977900	0.0072
CointEq(-1)*	-0.139644	0.031472	-4.437162	0.0002
R-squared	0.781139	Mean dependent var		0.104966
Adjusted R-squared	0.743077	S.D. dependent var		0.094214
S.E. of regression	0.047755	Akaike info criterion		-3.085042
Sum squared resid	0.052452	Schwarz criterion		-2.847149
Log likelihood	48.19059	Hannan-Quinn criter.		-3.012316
Durbin-Watson stat	1.952605			

Source: Eviews 12 Outputs

3.3.3 Analysis and Interpretation of Long-Term Relationship

Table 04 shows that:

Savings has a positive impact on GDP in the long term, with statistical significance. This is consistent with economic theory, where a 1% increase in savings leads to a 0.68% increase in economic growth. This percentage reflects Algeria's orientation towards relying on domestic savings to steer the national economy, reducing dependence on petroleum revenues, which are the main source of savings in Algeria. However, due to the oil crisis in 2014, there has been a shift towards increasing regular tax collection, which has exceeded 50% of total public revenues since 2018.

Table 05: Results of Long-Term Parameter Estimates

ARDL Long Run Form and Bounds Test Dependent Variable: D(LGDP) Selected Model: ARDL(2, 3) Case 2: Restricted Constant and No Trend Date: 03/27/24 Time: 20:19 Sample: 1990 2020 Included observations: 28				
Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.557471	0.167422	3.329735	0.0032
LGDP(-1)*	-0.139644	0.048170	-2.898984	0.0086
LSAV(-1)	0.096353	0.042049	2.291470	0.0324
D(LGDP(-1))	0.289372	0.148268	1.951686	0.0644
D(LSAV)	0.283613	0.058125	4.879360	0.0001
D(LSAV(-1))	-0.166213	0.071104	-2.337597	0.0294
D(LSAV(-2))	-0.146700	0.052577	-2.790192	0.0110
* p-value incompatible with t-Bounds distribution.				
Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSAV	0.689991	0.106877	6.455961	0.0000
C	3.992077	0.984377	4.055433	0.0006
EC = LGDP - (0.6900*LSAV + 3.9921)				

Source: Eviews 12 Outputs

4. Conclusion:

Based on this study, it can be concluded that savings play a crucial role in enhancing and increasing economic activity, as it is one of the key components of economic growth. This justifies its role in improving economic performance and growth in Algeria. The study also found a long-term equilibrium relationship between savings and economic growth. Additionally, savings have a positive impact on GDP in the short term, with statistical significance. According to economic theory, a 1% increase in savings leads to a 0.28% increase in economic growth in the short term. There is also a short-term dynamic relationship between savings and economic growth, where a 1% increase in savings leads to a 0.68% increase in economic growth, also statistically significant. This emphasizes the importance of savings in economic activity and promoting economic growth.

In light of these results, it can be inferred that savings contribute to economic development in Algeria by providing the financial resources necessary for investment in productive projects and infrastructure. This enables governments, companies, and individuals to invest in vital sectors

such as industry, agriculture, and infrastructure, thereby enhancing productivity, increasing employment opportunities, and improving living standards.

Therefore, the following recommendations can be proposed:

- 1) Encouraging savings by creating a conducive environment for citizens and companies to save.
- 2) Implementing government policies to promote savings.
- 3) Providing financial incentives.
- 4) Enhancing financial literacy to foster sustainable economic growth
- 5) and improve the quality of life for Algerian citizens.

Bibliographie

1. Ajamia, M., & Nasif, E. (2008). Economic Development. Egypt: Al-Buhaira Press.
2. Al-Mutaim , M. A., & Mahmoud Al, A. S. (2020). The Impact of Savings on Economic Growth:A Case Study of a Developing Economy (Applied to Egypt). Scientific Journal of Financial and Commercial Studies, 1(1), 148-188.
3. Gardio, I. D. (2004). Mobilizing Savings. Swiss: Swiss Agency For Development and Cooperation.
4. John Maynard , K. J. (1990). Macroéconomie Keynésienne. Paris, La France: édition dunod.
5. Tadros Quraydah, S. (1981). Introduction to Economics. Lebanon: Dar Al-Nahda Al-Arabiyya,Beirut.
6. Ajamia, M., & Al-Labthi,, M. (2003). Economic Development. Egypt: University House.
7. Christian , R. (2004). 24 Mots clés de l'économie et de la gestion. France: Edition Maxi-Livre.
8. Guyots, F. (1979). Eléments de Macroéconomie . Paris: édition Tethnip.
9. Hachette. (2013). Le dictionnaire Français, édition algérienne. Paris: Hachette, édition algérienne, .

10. Hamdan , Z. (1971). Issues of Economic Development Financing in Underdeveloped Countries. Lebanon: Dar Al-Nahda Al-Arabiyya.
11. Hamdi , Z. (1971). Issues of Economic Development Financing in Underdeveloped Countries. Egypt: Dar Al-Nahda Al-Arabiyya.
12. Hussein , O. (1994). Development and Economic Planning. Algeria: D.M.G.
13. Kebir, M. (2016). Savings and Its Role in Economic Growth: An Analytical Study in Algeria Compared to Some Arab Countries. M'Sila, Mohamed Boudiaf University of M'Sila: , Faculty of Economic, Commercial, and Management Sciences, Mohamed Boudiaf University of M'Sila- PhD Thesis in Economic Sciences.
14. Kornai , J. (1984). , Socialisme Et Economique de la Pénurie. Paris, france: Edition Dunod.
15. Llmane, M. (2009). Dictionnaire d'économie et de Sciences sociales. Alger: Berti Edition .
16. Orji , A. (2013, Dec 7). Bank Savings and Bank Credits in Nigeria: Determinants and Impact on Economic Growth, , Turkey Posted: 7 Dec 2013,. International Journal of Economics and Financial Issues, 2(3), 357-372.
17. Ribaj , A., & Mexhuani , F. (2021). The impact of savings on economic growth in a developing country (the case of Kosovo), J Innov Entrep 10,1, 2021. Journal of Innovation and Entrepreneurship, 1-10.
18. Salem , A., & Al-Husseinan. (2021, a). , "Measuring the Impact of Savings and Investment on Economic Growth in Kuwait," , Menoufia University, Faculty of Commerce, Egypt, April , Issue 2, Scientific Journal of Commercial Research(2), 293-362.