The Impact of Macroeconomic Variables on Inflation Rate Using the ARDL Self-Regression Model During the Period 1990-2021

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Abstract:

The research paper examines the impact of certain economic variables on the inflation rate in Algeria during the period 1990-2021 using the Autoregressive Distributed Lag (ARDL) model. The model includes variables such as government spending, gross domestic product, and exchange rate. Unit root tests, cointegration tests using the ARDL approach, and diagnostic tests are employed to evaluate the model. The study also aims to test the short and long-term empirical relationship between the variables and the inflation rate. The study concluded that the model is interpretable after passing all diagnostic tests, with a long-term equilibrium relationship pointing from explanatory variables towards the inflation rate. Enter your abstract here (an abstract is a brief, comprehensive summary of the contents of the article).

Keywords: inflation rate, government spen ding, gross domestic product, exchange rate.

Jel Classification Codes : C32, E17, E6, N17.

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1. Introduction:

Inflation stands as one of the most pressing economic challenges faced by nations in recent years, compelling policymakers to curb and address its underlying causes. Moreover, inflation rates are influenced by various economic variables such as exchange rates, government expenditure, and gross domestic product. Like many other nations, Algeria endeavors to control and reduce inflation rates to their lowest levels, particularly following the recent COVID-19 pandemic. The pandemic prompted import restrictions and increased demand for domestic products, resulting in a general rise in prices and a decline in purchasing power for the general populace. This necessitates swift solutions to the inflation problem, which leaves significant negative impacts on both economic and social fronts, consequently dampening economic growth rates.

1.1. Study Problem:

What is the extent of the impact of the exchange rate, total government expenditure, and gross domestic product on the inflation rate in Algeria during the period 1990-2021?

1.2. The Study Objective:

The study aims to shed light on the topic of inflation and its various types, identify its main causes, and measure the impact of some economic variables such as government expenditure, GDP, and exchange rate on the inflation rate. Additionally, this study seeks to explore and analyze the relationship between these variables and the inflation rate in Algeria during the period from 1990 to 2021.

1.3. Study Methodology:

The study adopts a quantitative (empirical) approach through the analysis of standardized data for some variables and their impact on the inflation rate.(2021-1990)

1.4. Data Source: The World Bank (https://data.albankaldawli.org/country/DZ)

1.5. previous studies :

The topic of inflation in Algeria has received widespread attention from researchers, with a focus on studying its determinants and analyzing the impact of various economic variables on its behavior.

In this context, a number of studies have analyzed the impact of economic variables on inflation in Algeria, employing various econometric methods and different analytical models. Miloud, Mahboub, and Reman (2021) conducted an econometric study with the objective of analyzing the relationship between exchange rate volatility and inflation in Algeria during the period from 1990 to 2020. The researchers employed the autoregressive distributed lag (ARDL) model. The findings of the study demonstrated a statistically significant inverse correlation between exchange rate volatility and inflation, thereby substantiating the sensitivity of domestic prices to fluctuations in the value of the national currency.

In another study, Amir (2021) sought to analyze the determinants of inflation in Algeria during the period 1995-2020, focusing on both the exchange rate, interest rate, and money supply, using the ARDL model and the Toda-Yamamoto methodology to test the causal relationship. The study concluded that there are long- and short-term relationships between the studied variables and the inflation rate, emphasizing the crucial role of money supply in explaining inflationary behavior.

2. Definition of inflation and explanation of its mechanisms and possible causes :

2.1. Definition of inflation:

There are numerous concepts related to inflation, depending on the various perspectives from which the phenomenon is viewed, and the different criteria and principles used to analyze it. There are several forms of inflation, and among the most important concepts of inflation, we mention the following:

- Inflation is an increase in the quantity of money, leading to a rise in the price level, either through an increase in the money supply or as a result of the demand for it (ادبوب و لسبع، 2021 صفحة 40) .

- Inflation is an economic condition where the purchasing power of the monetary unit decreases due to rising prices. This leads to an increase in the velocity of money circulation and disrupts the function of money as a store of value (دعمي و تباني، 2020 صفحة 171).

- Definition of inflation based on the theory of supply and demand is: the result of an imbalance between supply and demand, where it is generally understood as an increase in demand outpacing supply, leading to a rise in the general price level(هتهات، 2021 صفحة 04) .

- The failure of aggregate supply of factors of production to respond to actual aggregate demand, which typically results in a continuous rise in the price level (توفيق مسلّم، 2015 صفحة 31).

2.2. Types of inflation:

There are several forms of inflation, including:

❖ **In terms of state control over prices:**

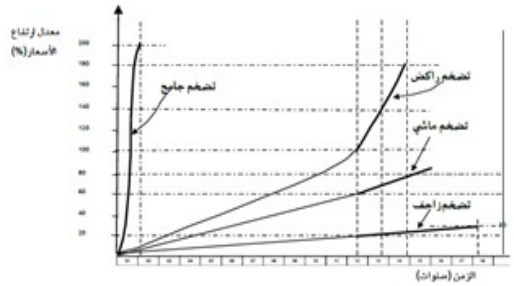
- **Visible Inflation:** Unnatural non-intervention by governmental authorities (laissez-faire) (دعمي و تباني، 2020 صفحة 172).
- **Suppressed Inflation:** It is when prices cannot rise due to the presence of qualitative or quantitative policies and restrictions preventing it. Once these restrictions are lifted, prices will rapidly increase ادبوب و لسبع، (2021 صفحة 40)
- **Latent Inflation:** It affects national income in the form of a significant and unnatural increase in income without being allowed to manifest itself naturally through increases in spending on consumption goods and investment(لكحل ، 2015 - 2016 ص51) .

1. **In terms of the degree of inflation (146 صفحة 2013 ,بلقاضي)**

- **Creeping Inflation:** Characterized by a slow rise in prices of around 2% annually until aggregate demand remains moderate, resulting in a relative increase over the long term.
- **Galloping Inflation:** Represents a rapid and uninterrupted rise in prices, with money circulation accelerating, making it difficult for the government to control the situation. Money loses its purchasing power and value as a medium of exchange and a store of value.
- **Trotting Inflation:** When prices continuously rise at a rate of 5% to 10% annually.
- **Running Inflation:** In this category, the rate of increase is much higher than creeping and trotting inflation (لكحل ، 2016 صفحة 53).

The following figure illustrates the types of inflation according to their severity:

Fig.1. The figure compares the types of inflation based on their severity.



Source: (لكحل ، 2016 ص 53)

2. **In terms of international economic relations:**

- **Source Inflation:** Occurs as a result of an increase in the cash reserves of central banks in dollars (dollar standard) (دعمي و تباني، 2020 صفحة 173).
- **Imported Inflation:** This phenomenon leads to a continuous increase in the general price level due to either an excess in aggregate demand or an increase in costs of goods sourced from external factors (شقبقب و بن زيان، 2017 ص 92).

3. **In terms of inflationary pressure (173 صفحة 2020 ،دعمي و تباني):**

- **Demand-Pull Inflation:** It occurs due to an increase in aggregate demand over aggregate supply, meaning demand exceeds the productive capacity of the economy.
- **Cost-Push Inflation:** Arises as a result of rising production costs, especially wages. This type is known as Wage-Push Inflation.

4. **Other Types (41 – 40 الصفحات 2021 ،ادبوب و لسبع) :**

- **Accelerated Inflation:** Characterized by continuous and escalating increases in the price level.
- **Cyclical Inflation**: Occurs as a result of changes in aggregate supply and aggregate demand associated with

economic cycles.

2.3. Causes of inflation:

Through a review of theoretical and empirical studies, it is evident that the general causes of inflation are primarily related to demand and supply factors, particularly due to excessive money supply, and factors associated with cost-push inflation, such as rising production costs. Additionally, structural characteristics and incidental factors like natural disasters and international sanctions contribute to inflationary pressures Below, we present the most significant causes: (العيسوى ، 2008 صفحة 208)

❖ **Inflation resulting from aggregate demand:**

Occurs because the demand for products exceeds the supply in the market, because of (جمعة، 2019):

- Increase in government expenditures coupled with budget deficits.
- Rise in household consumption spending due to higher wages or consumer loans.
- Growth in investment spending by financial institutions through bank loans.
- Expansion in exports leading to a surplus in the trade balance.
- Insufficient aggregate supply resulting from capital shortages, inadequate inventories, import constraints, or production inflexibility.

❖ **Inflation resulting from low public supply:**

Among the most significant reasons leading to a decrease in aggregate supply are (دعمي و تباني، 2020 صفحة 172):

- Achieving full employment levels that are lower than the aggregate demand.
- Inflexibility and inadequacy of the production apparatus in supplying the market with goods and services in high demand.
- Shortage of physical capital employed at full employment levels.
- Increase in prices of production inputs and import costs.
- High general level of prices: the general level of prices tends to rise whenever the general level of production costs rises in a given period of time, and vice versa and production costs usually rise due to many reasons, rising wages at rates exceeding productivity increases or as a result of increases in the prices of raw materials and intermediates used in the production process (هتهات، 2021 صفحة 07).

❖ **Structural Causes:**

These result from structural distortions in the economy, either due to supply-demand imbalances or structural disparities. A healthy state is achieved when supply matches demand. However, if supply fails to meet demand, especially at full employment, any increase in demand will inevitably lead to price hikes. This can occur with expansionary policies or increased currency issuance during full employment. Also, disparities in the

development level of economic sectors contribute. When one sector advances at the expense of others, the advanced sectors flourish, leading to increased demand for their products and subsequent price hikes. Conversely, underdeveloped sectors remain stagnant initially. However, their prices eventually rise due to chaotic pricing conditions rather than increased demand, resulting in overall price increases, especially in developing countries (توفيق مسلّم، 2015 الصفحات 31 – 32).

3. Evolution of Inflation Rate in Algeria

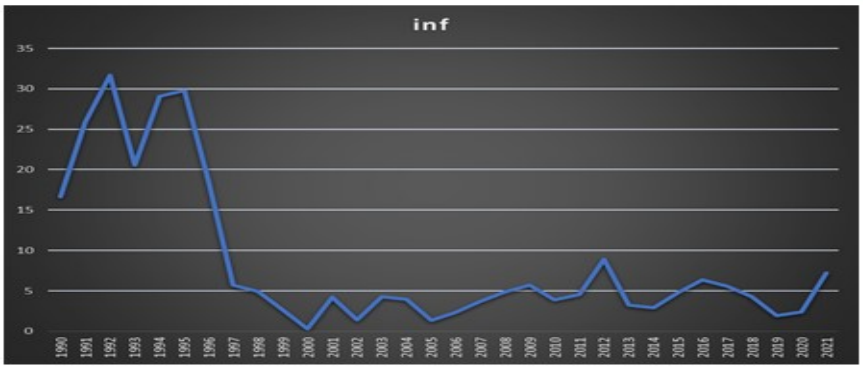
The trajectory of inflation rate in Algeria is influenced by a complex interplay of economic and political factors. Over recent years, the country has experienced notable fluctuations in inflation rate, In the following table are the inflation rate in Algeria from 1990 to 2021.

Table 01. Table provides a snapshot of the inflation rate in Algeria from 1990 to 2021.

1990	16.65253	2006	2.311499
1991	25.88639	2007	3.678996
1992	31.66966	2008	4.858591
1993	20.54033	2009	5.73706
1994	29.04766	2010	3.911062
1995	29.77963	2011	4.524212
1996	18.67908	2012	8.891451
1997	5.733523	2013	3.254239
1998	4.950162	2014	2.916927
1999	2.645511	2015	4.784447
2000	0.339163	2016	6.397695
2001	4.225988	2017	5.591116
2002	1.418302	2018	4.26999
2003	4.268954	2019	1.951768
2004	3.9618	2020	2.415131
2005	1.382447	2021	7.226063

Source: https://data.albankaldawli.org/indicator/FP.CPI.TOTL.ZG?end=2021&start=1990

Fig.2. figure illustrates the evolution of the inflation rate in Algeria from 1990 to 2021.



Source: Prepared by researcher based on the data from the previous table.

We observed from the previous table and figure that the inflation rates in Algeria were volatile during the period from 1990 to 2000. At the beginning of that period, inflation rates recorded a significant increase, reaching their peak in 1992 at 31.67%. This increase then significantly declined in 1996 to 18.68%, followed by a sharp decrease to 5.73% in 1997. By the end of the period, the inflation rate stabilized at low levels, recording its lowest level at 0.34% in 2000.

We can say that the structural reform program during the period 1995-1998 began to bear fruit in combating inflation starting from 1996. The inflation rate witnessed a significant decrease, dropping from 18.68% in 1996 to 2.64% in 1999, reaching 0.34% in 2000, which is a remarkably low rate. It increased slightly thereafter due to economic stimulus programs and increased spending(بلقاضي، 2013 صفحة 151) .

During the period 2000-2010, the inflation rate in Algeria was also volatile. It decreased from 4.18% in 2001 to 1.38% in 2005. However, starting from 2005, we observed an increase in the money supply growth rate until 2007, accompanied by a decline in real economic growth rate. This led to an increase in monetary stability coefficients, reaching 0.053, 0.170, and 0.180 in 2005, 2006, and 2007, respectively. Consequently, the inflation rate rose from 1.38% in 2005 to 5.73% in 2009. This increase in inflation in 2009 was attributed to the increase in the money supply in 2007 and 2008, resulting from an increase in public sector wages without a corresponding increase in real output(دعمي و تباني، 2020 صفحة 176) .

Following the previous period of increases, the inflation rate in 2010 dropped to 3.9% due to the narrowing of the average annual inflation gap between Algeria and the Eurozone. However, inflation quickly resumed its upward trend in 2011, reaching 4.5%. This was driven by the higher average level of agricultural product prices, which had a stronger impact on imported inflation. After the oil crisis, the inflation rate accelerated, reaching 4.8% in 2015 and 6.4% in 2016. This was primarily due to market control deficiencies and dominant situations in most consumer goods markets. In 2019, the inflation rate dropped to 1.95%, attributed to lower prices of some food products, especially agricultural ones (ادبوب و لسبع، 2021 صفحة 44) .

In 2021, Algeria witnessed a significant increase in the inflation rate, reaching 7.23%. This rise is notable and indicates a sharp increase in prices of goods and services during that period. It can be attributed to several possible factors such as rising production costs, increases in prices of essential commodities like energy and food, and the overall economic impact of the COVID-19 pandemic.

4. The Standard Study

We will delve into measuring and analyzing the relationship between (GDP), Gross National Expenditure, inflation rate, and exchange rate in Algeria during the period from 1990 to 2021.

4.1. Building the model and describing the variables

❖ **Building a study model:**

The model is based on the following linear function:

INF = f (GS, GDP, EX)

❖ **Description of Study Variables:**

After defining the model, we describe the variables using the model's variables based on the economic theory and available information about the variables of government spending, gross domestic product (GDP),

exchange rate, and inflation rate.

The variables	Icon	
Inflation Rate (measured by the Consumer Price Index)	INF	Inflation is a continuous and noticeable increase in the general level of prices of goods and services, accompanied by a corresponding decline in the purchasing power of the currency (أويابة و خليل، 2018 صفحة 166).
Government Spending (as a percentage of Gross Domestic Product)	GS	Total National Expenditure, or in other words, public spending, refers to the amount or cash flow disbursed by the government through its various entities to meet public needs (طلحة، كبير، و صوار، 2021 صفحة 493).
Gross Domestic Product	GDP	Gross Domestic Product (GDP) represents the quantity of final goods and services produced by individuals within the geographical boundaries of a country during a typical year, regardless of their nationality, whether they are citizens of the country or foreigners (الخزاعلة و الخوالده، 2015 صفحة 450).
Exchange Rate	EX	The exchange rate refers to the ratio of exchange between a unit of foreign currency and a unit of the national currency (طوير و مخطاري، 2021 صفحة 03).

4.2. unit root test:

Time series data are tested based on the level (level) and on the basis of the differences (1st diff), and in case these variables stabilize at the difference level, we proceed to determine the lag order for each variable according to the information criteria AIC, SC, and HQ, by taking the lowest value of the criteria. The following table illustrates the results of the ADF test:

Table 02. The results of the unit root test using the Augmented Dickey-Fuller (ADF):

	Level			1St diff		
Variables	Model 01	Model 02	Model 03	Model 04	Model 05	Model 06
INF	-1.440890	-1.640513	-1.779408	-5.549276*	-5.542031*	-5.591414*
GDP	5.103927	0.287988	-2.527900	-1.094654	-4.524823*	-4.454543*
GS	-0.238690	-1.882390	-2.116294	-5.427421*	-5.427421*	-5.281411*
EX	3.353527	-0.630401	-3.532194	-2.979416*	-3.892335*	-3.800183*
	Critical values at the level			The critical values for first differences		
Percentage	Model 01	Model 02	Model 3	Model 04	Model 05	Model 06
1%	-2.641672	-3.661661	-4.284580	-2.644302*	-3.670170*	4.296729-*
5%	-1.952066	-2.960411	-3.562882	-1.952473**	-2.963972**	-3.568379**
10%	-1.610400	-2.619160	-3.215267	-1.610211***	-2.621007***	-3.218382***

Source: Prepared by the student using Eviews12 software.

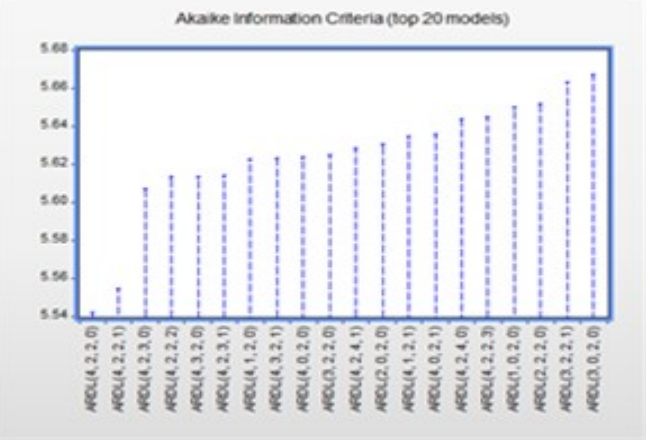
- (*) Indicates the significance of the trend coefficient or the constant term in the model.
- (*, **, ***) Indicate acceptance of the alternative hypothesis (H1), which states the absence of a unit root, meaning that the series is stationary. This is at significance levels of 10%, 5%, and 1%, respectively.

4.3. Test Bound:

This test determines the presence of a long-term relationship between study variables. However, before that, we need to determine the degree of lag based on the Akaike Information Criteria (AIC) criterion.

❖ **Determine the degree of the slowness of the ARDL model:**

Fig.3. Determine the degree of the slowness of the ARDL model



Source: Prepared by the student using Eviews12 software.

Through the above figure, we notice that the best degree of slowness according to the Akaike Information Criteria was (4.2.2.0) ARDL, and therefore we can perform the Test Bound.

❖ **Cointegration Test:**

Through this test, we can determine whether there is a long-term relationship between the dependent variable and the explanatory variables. This is done by testing the null hypothesis (H0) and the alternative hypothesis (H1) as follows:

Table .4. Test Bound

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.241514	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Actual Sample Size	28		Finite Sample: n=35	
		10%	2.618	3.532
		5%	3.164	4.194
		1%	4.428	5.816
			Finite Sample: n=30	
		10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Source: Prepared by the student using Eviews12 software.

Through the table, we observe that the computed statistic, 4.241514 = F-statistic, is greater than the critical statistic, 3.67 = I1 Bound, at a significance level of 5%. In this case, we reject the null hypothesis (H0) and accept the alternative hypothesis (H1), indicating a long-term relationship trending from the explanatory variables (Gross Domestic Product, Total Government Expenditure, and Exchange Rate) towards the dependent variable (Inflation Rate).

4.4. Estimating the ARDL Model: The inflation rate equation written as follows:

INF = C (1) *INF (-1) + C (2) *INF (-2) + C (3) *INF (-3) + C (4) *INF (-4) + C (5) *GS + C (6) *GS (-1) + C (7) *GS (-2) + C (8) *G DP + C (9) *GDP (-1) + C (10) *GDP (-2) + C (11) *EX + C

Table .5. Estimating the ARDL Model

Dependent Variable: INF
Method: ARDL
Date: 09/10/22 Time: 00:07
Sample (adjusted): 1994 2021
Included observations: 28 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): GS GDP EX
Fixed regressors: C
Number of models evaluated: 500
Selected Model: ARDL(4, 2, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
INF(-1)	0.650150	0.176809	3.677131	0.0020
INF(-2)	-0.367304	0.209175	-1.755971	0.0982
INF(-3)	-0.032985	0.223177	-0.147796	0.8843
INF(-4)	-0.265425	0.162490	-1.633492	0.1219
GS	0.227604	0.120959	1.881665	0.0782
GS(-1)	0.039003	0.152258	0.256166	0.8011
GS(-2)	0.217922	0.134553	1.619604	0.1249
GDP	-1.25E-10	2.46E-10	-0.510315	0.6168
GDP(-1)	-8.08E-10	3.52E-10	-2.293354	0.0357
GDP(-2)	9.09E-10	2.64E-10	3.449129	0.0033
EX	-0.268959	0.092970	-2.892972	0.0106
C	-10.26489	8.265180	-1.241944	0.2322

R-squared	0.876573	Mean dependent var	6.398302
Adjusted R-squared	0.791716	S.D. dependent var	7.297675
S.E. of regression	3.330521	Akaike info criterion	5.541662
Sum squared resid	177.4779	Schwarz criterion	6.112606
Log likelihood	-65.58326	Hannan-Quinn criter.	5.716205
F-statistic	10.33008	Durbin-Watson stat	1.943925
Prob(F-statistic)	0.000026		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Prepared by the student using Eviews12 software.

Through the above table, we note that the values of the coefficient of determination and the corrected coefficient of determination are large, which indicates the existence of a strong relationship, meaning that the total public expenditure, the inflation rate is explained through previous observations and late values of total public expenditure, gross domestic product, the exchange rate by 87% and 79%, and the rest is due to errors.

4.5. ARDL Errer Correction Regression:

Table .6. ARDL Errer Correction Regression:

ARDL Error Correction Regression
Dependent Variable: D(INF)
Selected Model: ARDL(4, 2, 2, 0)
Case 2: Restricted Constant and No Trend
Date: 09/10/22 Time: 00:26
Sample: 1990 2021
Included observations: 28

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INF(-1))	0.665715	0.176781	3.765763	0.0017
D(INF(-2))	0.298410	0.139564	2.138156	0.0483
D(INF(-3))	0.265425	0.130737	2.030220	0.0593
D(GS)	0.227604	0.090699	2.509444	0.0232
D(GS(-1))	-0.217922	0.099868	-2.182107	0.0444
D(GDP)	-1.25E-10	1.78E-10	-0.705215	0.4908
D(GDP(-1))	-9.09E-10	2.02E-10	-4.508153	0.0004
CointEq(-1)*	-1.015565	0.197246	-5.148734	0.0001

R-squared	0.647364	Mean dependent var	-0.475509
Adjusted R-squared	0.523941	S.D. dependent var	4.317444
S.E. of regression	2.978908	Akaike info criterion	5.255947
Sum squared resid	177.4779	Schwarz criterion	5.636577
Log likelihood	-65.58326	Hannan-Quinn criter.	5.372310
Durbin-Watson stat	1.943925		

* p-value incompatible with t-Bounds distribution.

Source: Prepared by the student using Eviews12 software.

The experimental results of the relationship in the short-term show that the model explains 64% of the variables in the inflation rate during the short-term period that the error correction coefficient is negative 1.015565 = (-1) CointEq and significant because the probability is less 5%, and this increases the accuracy and validity of the equilibrium relationship in the long term.

4.6. Autocorrelation Study (LM Test):

- **Null Hypothesis:** No autocorrelation of errors H0: Φ =1
- **Alternative Hypothesis:** Existence of autocorrelation of errors H1: Φ #1

Table.7. Results of LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.104987	Prob. F(2,14)	0.9010
Obs*R-squared	0.413744	Prob. Chi-Square(2)	0.8131

Source: Prepared by the student using Eviews12 software.

We note from the above table that the probability value (prob) is greater than the level of significance 5% and therefore we accept the null hypothesis H0 that there is no self-correlation of errors.

4.7. Heteroskedasticity Test: Breusch-Pagan-Godfrey

Table 8. Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.859188	Prob. F(11,16)	0.5921
Obs*R-squared	10.39760	Prob. Chi-Square(11)	0.4950
Scaled explained SS	1.987692	Prob. Chi-Square(11)	0.9985

Source: Prepared by the student using Eviews12 software.

From the table above, we observe that the probability value for the test of heteroscedasticity, which is 0.5921 = (22.12) Prob. F, is greater than 5%. Therefore, we reject the alternative hypothesis H1 and accept the null hypothesis, indicating that the estimated model is free from the problem of heteroscedasticity.

4.8. Heteroskedasticity Test: ARCH

Table 8. Heteroskedasticity Test: ARCH

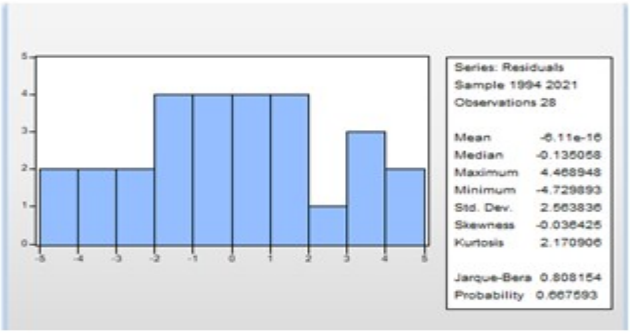
Heteroskedasticity Test: ARCH			
F-statistic	0.198479	Prob. F(1,32)	0.6590
Obs*R-squared	0.209584	Prob. Chi-Square(1)	0.6471

Source: Prepared by the student using Eviews12 software.

We note through the ARCH effect test that the probability of the effect test 0.2290 = (23, 2) Prob. F is greater than 5%, and therefore we reject the alternative hypothesis H1 and accept the null hypothesis, which means achieving the hypothesis of stability or homogeneity of variance.

4.9. normality test for residuals of the ARDL model

Fig.1. Jarque-Bera test results



Source: Prepared by the student using Eviews12 software.

We observe from the residuals test results that the probability value exceeds the 5% significance level. Consequently, we accept the null hypothesis, indicating that all residuals follow a normal distribution, Therefore, we can depend on this model to elucidate the influence of total public spending, gross domestic product, and exchange rate on the inflation rate in Algeria.

5. Conclusion:

In this study, we analyzed the impact of some macro-economic variables on the inflation rate using the Autoregressive Distributed Lag (ARDL) model for time-series data. This analysis covered the period from 1990 to 2021, utilizing data obtained from the World Bank. Through this research paper, we arrived at the following results and recommendations:

5.1. Results:

- ✓ The estimation results revealed a stable, long-term equilibrium relationship between aggregate national expenditure, gross domestic product (GDP), and the exchange rate, on the one hand, and the inflation rate, on the other. This reflects the continuing influence of these variables in explaining the long-term behavior of inflation.
- ✓ The study demonstrated that the current inflation rate is influenced by its past levels, as well as by the lagged values of aggregate national expenditure, GDP, and the exchange rate, indicating the presence of continuity and self-influence in the inflationary phenomenon.
- ✓ Diagnostic tests showed that the estimated model has good statistical properties, as there was no evidence of autocorrelation of the residuals or heteroscedasticity. It was also confirmed that the residuals follow a normal distribution, which supports the reliability of the results derived from the model.
- ✓ The model results demonstrated a high degree of consistency between the short- and long-term conclusions, reflecting the stability of the dynamic structure of the relationship between the studied economic variables and the inflation rate during the research period. • The inflation rate in Algeria

witnessed clear fluctuations during the period under study, as it recorded periods of sharp increases followed by periods of significant decline, indicating the presence of economic fluctuations and relative instability in the overall economic environment.

5.2. Recommendations:

- Algeria's economic authorities should adopt flexible, proactive monetary and fiscal policies to address inflationary fluctuations, while developing tools to anticipate and forecast changes in inflation rates based on the dynamics of influential economic variables.
- It is necessary to enhance the stability of the national economy by adopting economic policies that focus on diversifying sources of growth, in a way that reduces sharp fluctuations in inflation rates and mitigates the impact of external shocks on the local economy.
- The government must improve the efficiency of public spending and direct investments toward productive sectors with high added value, such as industry and agriculture, with the aim of increasing domestic supply and reducing demand-related inflationary pressures.
- Supporting the investment climate and attracting foreign direct investment will contribute to enhancing national production capacity, transferring technology, and reducing production costs, which will positively impact price stability.
- Reliance on the hydrocarbon sector as a primary source of revenue must be reduced by developing other sectors, such as agriculture and industry, which will contribute to improving the trade balance and reducing the impact of imported inflation. • The need to improve transparency and accountability in managing economic policies, particularly with regard to public finance and monetary policy, to ensure the effectiveness of economic interventions and build trust with citizens and investors.
- It is important to strengthen economic partnerships with international financial institutions to leverage best practices in inflation management and develop appropriate strategies to address economic crises.

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