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The effect of the general budget deficit on economic growth in Algeria using the Autoregressive Distributed Lag "ARDL" model

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Abstract

This standard study aims to test the effect of the balance of the budget deficit on economic growth in Algeria using the Autoregressive Distributed Lag (ARDL) model. We obtained a series of annual data for each of the budget deficit and the gross domestic product during the period (1990-2020) from the reports of the Bank of Algeria; While the data of the gross domestic product, we relied on the data of the World Bank. The results of estimating a long-term model showed that there is an inverse relationship between the balance of the general budget and economic growth in the short term, as well as the existence of a soft relationship between them in the long term; While the results of the validity tests of the model proved that it is possible to rely on the results of the long-term and short-term parameters for the correct diagnosis.

Keywords: public budget, budget deficit, economic growth, Algeria, AutoRegressive Distributed Lag (ARDL) model.

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1. INTRODUCTION

The world witnessed many economic and political crises, on top of which was the global recession, which led to a review of the extent of government intervention in economic activity. The role of the state has grown by intervening in economic and social life under the pressure of economic crises and their negative effects, however, the difference that sparked widespread controversy was related to the methods and mechanisms that enable governments to achieve their economic goals with great effectiveness in impact, in exchange for mitigating risks and reducing costs. Here, schools of economic thought differed in their various orientations in the problematic: "Which economic policies have an effective impact on output and employment?"

And given that the Algerian economy, which relies mainly on financing on the hydrocarbon sector, decision-makers have included spending fiscal policies among the priorities of the economic policies through which it aimed to achieve economic and social stability. Those spending policies that are often funded from the revenues of the fuel sector, whose markets are characterized by fluctuations and huge circumstantial turmoil, as fluctuations in oil prices are often reflected in the financing of government projects whose projects take a time horizon that extends for several years, which makes government policies and programs funded under Balance deficit in order to achieve those desired economic goals in some periods.

1.1 Study problematic:

Through the foregoing, the problematic of the study poses itself in this context about:

What is the impact of the state budget deficit on economic growth in Algeria?

1.2 Study hypothesis:

The study relies on the hypothesis that there is a direct relationship between the

general budget deficit and economic growth, meaning that the higher the general budget deficit, the higher the level of economic growth.

1.3 Objectives of the study:

This applied study aims to achieve a number of objectives, the most important of which are:

- Analyzing the reality and trend of both the budget deficit and growth in the Algerian economy, to draw a picture of the economic climate experienced by the Algerian economy during the study period (1990-2020).
- An attempt to build a standard model to study and analyze the impact of the state's budget deficit on economic growth.
- Testing the hypothesis of the impact of fiscal policies and the budget deficit on economic growth in Algeria, and proving which intellectual trend is based on and supports financial policies in Algeria.
- Presenting some suggestions to decision makers, which would help in remedying some imbalances at the level of fiscal policy and the advancement of the Algerian economy.

1.4 Previous studies:

The study of **Rehmen Waliur Mehboob Ahmed, Goher Fatima, (2012)**: It examined the effects of the public budget deficit on economic growth in Pakistan; The study aimed to identify the real impact of the public budget deficit on economic growth in Pakistan, and a regression analysis was conducted for time series for the period 1978-2009 to ascertain the impact of the budget deficit on economic growth. The study concluded that there is a negative impact of the general budget deficit on economic growth in Pakistan.

The study of **Mahdi Sahar Al-Jabouri, Salam Kazem Shani 2015**: It studied the causal relationship between the public budget deficit and the gross domestic product in Iraq for the period 1988-2009, using the VAR estimation method; While the study changes to clarify the relationship between them, it was found through analysis a close and strong inverse relationship between the deficit and the GDP growth rate in the current year, as the increase in the general budget deficit rate reduces the GDP growth rate in the current year, so when the deficit rate exceeds the critical level, this leads to a decrease output growth; As for the decrease in the deficit rate, this will lead to the growth of output, and that the impact of the components of the general budget on the gross domestic product extends to the previous two years, and that the two variables above are associated with a direct relationship with the GDP for the current year.

Tung 2018 study: This research examined the impact of the public budget deficit on economic growth in Vietnam using the VECM model, on an annual data series from 2003 to 2016. The results of the study confirmed the existence of a long-term equilibrium relationship between the budget deficit and economic growth. The results also showed that the budget deficit has a negative impact on economic growth in this country in the short and long term.

Benalbar Study 2019: This study aimed to measure the impact of the public budget deficit on economic growth in Algeria by using the unrestricted error correction model for Autoregressive Distribution Lag Bound Test (ARDL) during the period 1990-2017.

1.5 Theoretical study:

The state's general budget deficit is one of the biggest problems facing the economies of the countries of the world, as this deficit resulted in many effects on the overall macroeconomic variables. Some economists consider that the budget deficit is a mistake that is not supposed to occur, and it is difficult to avoid it and treat it, and it

is not easy to define it, hence the urgent need to deal with this concept from all aspects.

2. General concepts of the budget deficit of the state and Economic Growth

2.1 Definition of the budget deficit of the state:

The budget deficit has been defined from different points of view, since from an economic and social point of view it is meant to be a lack of public revenues to finance public expenditures in its various forms, including investment expenditures and current expenditures; This is the work of the state, as it covers this difference through internal or external loans in order to achieve economic and social goals. As for from a structural point of view, it is defined as the structural imbalance in the economy, that is, the lack of public revenues over public expenditures, as a result of the structural imbalance that exists between the production streams, which leads to borrowing in order to finance public spending, which leads to an increase in the structural imbalance again. From a financial point of view, it means the increase in the total amounts of public expenditures estimated in the general budget for a particular fiscal year over the total amounts of public revenues estimated in the general budget for the same year. (Ahmed & And others, 2021)

2.2 Definition of Economic Growth:

Economic growth is a process that includes profound changes that increase the productive capacity of the national economy in a steady and continuous way. It is measured by the real gross national product, and there is another more accurate measure, which is the average per capita income, as it is used for countries whose statistics on population size are incorrect. (Sahel, 2018)

2.3 The theoretical background of the relationship between the budget deficit and economic growth:

Since the dawn of economics, the issue of government interference in economic life has been and continues to raise intellectual debate on a large scale, where the subject of macroeconomic policies is considered a crossroads in which many intellectual opinions and theoretical propositions conflicted according to their affiliation and schools. As for the issue of financial policies and their relationship to the gross domestic product, it is considered one of the most controversial topics in the intellectual arena of economics. Where the owners of the traditional classical thesis believe that the economy and markets balance automatically with the help of the hidden hand represented by market mechanisms without the state's intervention with government policies; Neither fiscal nor monetary policies - according to them - are capable of affecting real economic activity. The budget deficit in particular is sterile in terms of affecting income and employment. Governments, after adopting these policies, will only reap the budget deficit, in addition to its negative impact on interest rates and disturbing the investment climate by creating a gap of competition, which results in the expulsion of part of private investments. As for the Keynesian proposal, it is the one that gives more priority and attention to fiscal policies, because government spending and taxes are capable of influencing the size of aggregate demand in the economy; The Keynesian proposal sees the effectiveness of expansionary fiscal policies in activating demand and increasing income from the point of view that the budget deficit has a direct effect on economic growth.

As for Friedman and the monetarists, he believes that the impact of fiscal policies on output and income is less flexible and important than the impact of monetary policies, as Friedman assumes that money demand is less flexible with interest rates, and that investment sensitivity to interest rates is very high, which means that the budget deficit widens the competition gap; Thus, financial expansion is less effective

than monetary expansion. As for the new classics, they see the opposite of what the Keynesians see, as they build their perception on a basis completely opposite to what the Keynesians see. They see that the budget deficit has a negative impact on economic growth, which means that the fiscal expansion represented in the budget deficit will act to curb the pace of internal product growth.

Through the foregoing, the extent of the intellectual conflict and discrepancy is evident with regard to the relationship of fiscal policies and the budget deficit to internal output and the role of these policies in achieving economic growth (Rabah & others, 2020).

3. The evolution of the general budget balance in Algeria during the period (2000-2020):

The general budget is a statement of the financial position of the state at a specific point in time and contains the revenues and expenditures of the state in a specific period; The general budget in Algeria has known many changes in the laws that regulate it, but its main features were identified by the issuance of Law 84_17 dated July 10, 1984 and amended in 1988; Where he dealt with most of the aspects related to it.

3.1 The general budget of the state in the Algerian legislation:

French financial legislation is considered the main reference that governed most of the articles of the general budget in Algeria during the colonial era. During this period, the budget experienced several changes that can be divided into:

- The first period (1844-1860): the budget was exceeded and attached to the Minister of War, then attached to the "French Special Ministries" in Algeria;
- The second period (1860-1881): In this period, the Governor-General was

the one who prepared the draft budget and sent it to the Minister of War, who was attached to his ministry, and then it was transferred to the Ministry of the Interior.

- The third period (1881-1920): in which the Algerian interests were attached to the ministries concerned with them, and in August 1898 financial negotiations were established that negotiated the Algerian interests.

In the year 1931, Algeria was recognized as a financial personality, despite the fact that its budgets are close to the local budgets, whether in composition or form. In September 1947, the Algerian Council was established, which approved the general budget, including the budget of the south, which was independent of regulatory and legal provisions, but lacked the full exercise of financial sovereignty; In December 1962, the first budget was approved for independent Algeria, but the issuance of Law 84_17 of July 10, 1984 determined the main features of the general budget in Algeria. (Yahia, 2002)

The general budget is defined according to the Algerian legislator in the text of Article 3 03 of Law 90-21. The budget is: "The document that estimates for the civil year the total revenues and expenditures related to management and investment, including public equipment expenses and expenditures with a capital and authorizes it." And according to Article 6 06 of Law 84_17 of July 17, 1984, the budget was defined as: "It is formed from the final expenditures and revenues of the state, determined annually according to the Finance Law, in accordance with the applicable legislative and regulatory provisions"; The following table shows the evolution of the general budget balance during the period (1990-2020).

Table .1: The evolution of the general budget balance in Algeria during the period (1990-2020) (Unit: billion DZD)

Years	budget balance	years	budget balance	years	budget balance
1990	**17.7**	**2000**	**400**	**2011**	**-63**
1991	**31.1**	**2001**	**184.5**	**2012**	**-758.6**
1992	**7.9**	**2002**	**52. 6**	**2013**	**-151.2**
1993	**-162.6**	**2003**	**284.2**	**2014**	**-1261.2**
1994	**-89.2**	**2004**	**337.9**	**2015**	**-2553.2**
1995	**-147.9**	**2005**	**1030.6**	**2016**	**-2341.4**
1996	**100.6**	**2006**	**1186.8**	**2017**	**-1206.5**
1997	**81.5**	**2007**	**579.3**	**2018**	**-974.9**
1998	**-101.2**	**2008**	**999.5**	**2019**	**-1139**
1999	**-11.2**	**2009**	**-570**	**2020**	**-1261.9**
		2010	**-74**		

Source: Annual reports of the Central Bank on the website: https://www.bank-of-algeria.dz/html/rapport.htm, viewing date: 08-12-2022, at 3:00.

We note from the above table that the public financial situation has improved through the elimination of the budget deficit, as a budget surplus appeared in the early nineties as a result of the rise in oil prices and the Gulf War. The economic situation experienced a yearly crisis from 1993 to 1995 due to the drop in oil prices and the security stability that the country witnessed. In order to confront this crisis, the authorities concluded an agreement to prepare for credit, and among the results achieved from this agreement - starting from the years 1996-1997 - the improvement of the balance balance. In general, it can be said that the nineties period was characterized by an uneven deficit due to the economic, social and political conditions and security stability, which made an increase in the growth rates of public spending exceeding the growth rates of public revenues in most years. In the year 2000, there was a surplus in the general budget amounting to 400 billion DZD, due to the increase in public revenues as a result of the rise in oil prices to 28.22 dollars per barrel in 2000. In this regard, Algeria has established a special fund (Resource Control Fund), dedicated to absorbing the annual financial surpluses of the state budget, and the balance of the budget remained positive until the global financial crisis in 2008, which had a direct impact on the decline in global investments, and thus the decline in demand

for oil, which led to the decline in oil prices, Consequently, the decrease in oil taxation and the occurrence of a deficit in the general budget, and also as a result of the large and clear increase in public expenditures due to the development programs adopted (from the economic recovery program to the supplementary program to support growth and the growth consolidation program), so that the deficit continues to reach its highest level in 2015, when it reached -2553.2 billion dollars after the oil crisis of 2014, where oil prices fell to 96 dollars per barrel, continuing to decline until 2017, and thus continuing to decline petroleum taxation, which affected the various elements of the general budget and highlighted the fragility of the national economy.

It led to a decrease in public revenues, and here the danger was felt with regard to the public treasury, which had to work to achieve financial stability in order to balance and control the levels of deficit and ways to finance it. In order to mitigate the deficit, it is necessary to rationalize government spending by reducing government entertainment spending, increasing government spending producing revenues, raising the efficiency of the tax system, increasing the efficiency of allocating government spending, and increasing government spending that is consistent with improving the local investment climate.

In 2018, the budget deficit narrowed to 974.9 billion dirhams, as a result of the significant increase in public revenues, mainly fuel revenues. While in 2019 a slight decrease in both revenues and total expenditures resulted in a near-stability in the budget deficit by 1 139 billion dinars, as the general budget recorded in 2020 a deficit amounting to -1261.9 billion dinars, resulting from the global health crisis Covid 19, which coincided with the decline in oil prices and production; Hence the decline in oil taxation, which led to dire repercussions on the economic situation of Algeria, which is already suffering from fragility..

4. RESULTS AND DISCUSSION

First: Defining the study variables

In this paper, we will study the impact of the general budget balance on economic growth; Where the per capita GDP is the best representation of the development of economic growth; The following table shows the nature of the variables used under study:

Table 2. Definition of study variables

Variable	Code	Data source	Duration
per capita gross domestic product (GDP)	**PIBH**	**The World Bank**	**1990-2020**
(in constant local currency)	**BP**	**Bank of Algeria**	**1990-2020**

Source: Prepared by researchers

Second: Estimating the model using the OLS method

The method of least squares OLS is the most widely used method in regression analysis, as it is considered one of the best methods of estimation, and this is due to the fact that it is the method that gives us the least sum of squares of the remainders compared to any other method. (Djoudjerat, 2015, p. 95)

Table 3. Model estimation by the OLS method

Dependent Variable: PIBH
Method: Least Squares
Date: 12/19/22 Time: 01:22
Sample: 1990 2020
Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BP	-29.57642	10.40726	-2.841903	0.0081
C	375765.8	9176.563	40.94843	0.0000

R-squared	0.217832	Mean dependent var	382990.9
Adjusted R-squared	0.190860	S.D. dependent var	54576.77
S.E. of regression	49093.00	Akaike info criterion	24.50316
Sum squared resid	6.99E+10	Schwarz criterion	24.59568
Log likelihood	-377.7990	Hannan-Quinn criter.	24.53332
F-statistic	8.076414	Durbin-Watson stat	0.162856
Prob(F-statistic)	0.008125		

Source: Prepared by researchers based on EViews 12

Through the previous outputs, we find that the budget balance parameter has an inverse relationship with the per capita GDP, as if the budget balance increases by one unit, the per capita share will decrease by 29.57 units; Through the statistical analysis, we find that the budget balance parameter has a significant significance (t_c=-2.84; prob=0.0081<0.05), while we find the value of the determination coefficient R^2 estimated at 21%, which is a weak percentage, and the validity of the model as a whole is significant using a test Fisher accepted F_c=8.07; prob=0.008<0.05.

Through the results obtained, we notice signs of the existence of the problem of false regression, through the value of Darbin Watson DW = 0.16, which is smaller than the value of the coefficient of determination R ^ 2 = 0.21 (Djoudjerat, 2015, p. 1037) ; Therefore, the data of the original chains must be reconsidered, as it is possible that the chains are distorted and unstable, and therefore we will resort to the stability of the chains and study the impact of agricultural output on economic growth in the long run.

Third: Study the stability of the chains

The stable time series is the one whose levels change with time without the average change in it, and that is during a relatively long period of time, in the sense that the series does not have a trend neither towards an increase nor towards a decrease, and as for the unstable series, the average level in it changes constantly, whether towards an increase or decrease. (Baltagi, p. 373)

The Philip Peron (PP) test is considered one of the best stability tests because it corrects the two problems of autocorrelation of the remainders, and the instability of variance within the unit root models, as it relies on the same distributions of the ADF test, and in order to estimate this variance, it is necessary to find the estimated number of lags in terms of The total number of views is as follows: (CHIKHI, 2017, p. 212)

$$I \approx 4\left(n = 31/100\right)^{2/9} \approx 3$$

The following table shows the results of the chains test:

Table 4. Results of the Philippe Perron PP test

Variables		Model	Variables Calculated Values Critical Values at 5%			Variables Calculated Values Critical Values at 5%		
			General trend	Constant	Unit root	General trend	Constant	Unit root
PIBH	at level	Model 6	0.58	0.87	-0.76	3,25	3.59	-3,58
		Model 5		0.85	-0.83		2,97	-2,97
		Model 4			0.83			-1,95
	at the first difference	Model 4			***-1.80			-1,95
BP	at level	Model 4	-1.57	1.00	-2.23	3,25	3.59	-3,58
		Model 5		-0.80	-1.59		2,97	-2,97
		Model 6			-1.44			-1,95
	at the first difference	Model 4			-6.12			-1,95
***: acceptable at 10%								

Source: Prepared by researchers based on EViews 12

Through Philip Peron's test, we note that the series PIBH and the series BP are not stable in level due to the presence of the unit root in model 4 for both variables, meaning we accept the hypothesis H_0, which acknowledges the existence of the unit root, by not accepting models 5 and 6 because of their insignificance; When making the first difference, it was found that the series BP is stable at the first difference |-6.12|>|-1.95| At a significant level of 5%, the PIBH series is also stable at the first difference |-1.80|>|-1.61| At a significance level of 10%, which means that they are two complementary series of degree I (1); Therefore, we are faced with the possibility of a case of co-integration between the previous variables, so we will use the method of co-integration by using the ARDL autoregressive model.

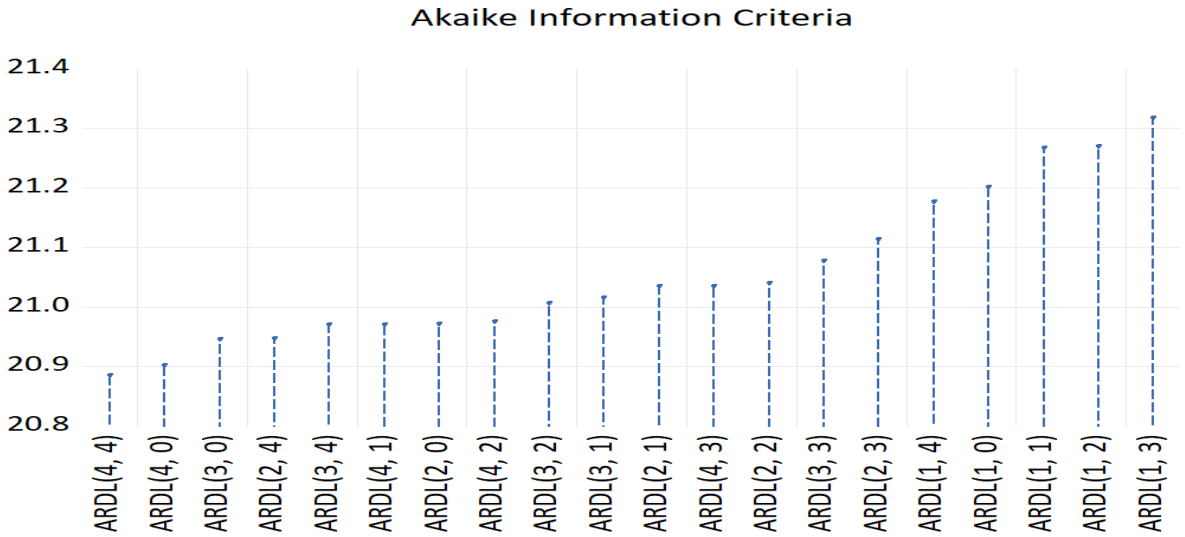
Fourth: ARDL co-integration methodology

Conventional cointegration tests require integrated time series of the same degree, and at different levels than their original, which explains the limited use of these tests; For this purpose, a new method called co-integration methodology appeared using the autoregressive model of lagging distributed time gaps (ARDL), developed by Pasaran (1997), Shinand And Sun (1998) and Pasaran et al., these models combine the AR model with the finite distributed lag model, as this test does not require the stability of time series of the same degree; ARDL can be applied if it is stable at levels I(0), or integral of the same degree I(1), or a mixture of the two, but the time series must not be integrated of the second degree I(2). (Dahmani, 2013, p. 236)

Determine the number of gaps for the model:

To determine the number of optimal decelerations, we calculated the Akaike information criterion (AIC) for several time delays, which are shown in the following figure:

Figure.1: Results of the AIC criterion for selecting the optimal deceleration length



Source: Prepared by researchers based on EViews 12

From the previous figure, we note that the optimal slowdown period is 4

delays for the "per capita gross domestic product (PIBH)" variable, and 4 delays for the "general budget balance BP" variable; Hence, the best model according to the (AIC) standard is the ARDL (4.4) model.

4-2 Cointegration test using the Bounds test:

To ensure the existence of a long-term equilibrium relationship within the framework of the unconstrained error-correction model, Pasaran et al. presented a new approach to test the extent to which the long-term equilibrium relationship was achieved, and its results were as follows:

Table.5: Bounds test results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.990708	10%	3.02	3.51
k	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58

Source: Prepared by researchers based on EViews 12

The statistic calculated for this test and accompanying the null hypothesis (F stat.=3.99) is greater than the values of the upper limit of the critical values at the 10% level; Accordingly, we can reject the null hypothesis H_0, and accept the alternative hypothesis H_1, to make sure that there is a long-term equilibrium relationship, moving from the explanatory variable "balance of the general budget BP" towards the dependent variable "per capita GDP (PIBH) in Algeria."

4-3 Estimating the parameters of the relationship in the long run:

After confirming the existence of a cointegration relationship between "per capita GDP" and the independent variable "public budget balance", we will measure the long-term relationship using the ARDL model, and the results are shown in the table:

Table.6: Estimates of long-run parameters

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BP	8.380992	30.50458	0.274745	0.7868
C	377450.0	20974.16	17.99596	0.0000

EC = PIBH - (8.3810*BP + 377449.9880)

Source: Prepared by researchers based on EViews 12

From the results above, we note the positive effect of the balance of the general budget BP on the growth of per capita GDP (PIBH), as an increase in the balance of the general budget by one unit leads to an increase in per capita GDP by 8.38 units, while we note that the parameter of the balance of the general budget BP is statistically It has no significant significance as $t_c=0.27<t_t=2.060$.

4-4- Estimating the parameters of the relationship in the short run:

Since the results of the Bounds test confirmed the existence of a cointegration relationship between the variables, which means the existence of a long-term relationship, so we can estimate the short-term relationship using the ARDL error correction model, and the results were as follows:

Table (7): Estimation results of the error correction model

ARDL Error Correction Regression
Dependent Variable: D(PIBH)
Selected Model: ARDL(4, 4)
Case 2: Restricted Constant and No Trend
Date: 12/19/22 Time: 17:30
Sample: 1990 2020
Included observations: 27

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PIBH(-1))	0.346338	0.230236	1.504271	0.1509
D(PIBH(-2))	0.183955	0.229308	0.802218	0.4335
D(PIBH(-3))	0.467377	0.234129	1.996235	0.0622
D(BP)	-2.660313	2.369523	-1.122721	0.2772
D(BP(-1))	-5.395034	2.404480	-2.243742	0.0385
D(BP(-2))	-3.025245	2.590602	-1.167777	0.2590
D(BP(-3))	-5.617720	2.438145	-2.304096	0.0341
CointEq(-1)*	-0.099228	0.027127	-3.657952	0.0019

R-squared	0.623509	Mean dependent var	3871.324
Adjusted R-squared	0.484802	S.D. dependent var	9511.593
S.E. of regression	6827.166	Akaike info criterion	20.73640
Sum squared resid	8.86E+08	Schwarz criterion	21.12035
Log likelihood	-271.9414	Hannan-Quinn criter.	20.85057
Durbin-Watson stat	2.384159		

* p-value incompatible with t-Bounds distribution.

Source: Prepared by researchers based on EViews 12

The results of estimating the error correction model indicate that the parameter of the error correction threshold is negative (CointEq = -0.099), and significant t_c = |-3.65|>t_t = |2.060|, and this reflects the existence of a short-term equilibrium relationship between the variables of the study towards the long-term equilibrium; It means that 9.9% of the errors that can occur in the short term can be corrected in the long term within one year, which means that the speed of correcting the total error from the short term towards the long term is in about 10 years. We also note through the error correction model that the variable PIBH that is delayed in time for the first and second period has no significant significance, while we find that the variable PIBH that is delayed in time for three slowing periods is significant at 10%, and it also contributes to an increase in per capita; In our conclusion of the effect of the variable balance of the general budget BP in the short term, we noticed that all the slowing variables for this variable differ in their significance at the level of 5%, and have an inverse effect on the per capita share.

Fifth: Study the validity of the model:

To find out if this model is correct and reliable for proper economic diagnosis

and analysis, we will perform a set of tests:

5-1- Conformity test:

The congruence test aims to find out the extent to which the real values correspond to the estimated values, in addition to knowing the rates of deviations of the remainder from the confidence interval, where we can observe the almost complete congruence between the original series (Actual) and the estimated (Fitted), and this would give us an idea of the importance of the estimated model expression ARDL(4,4) on the studied string data.

Figure 2: Conformity test results

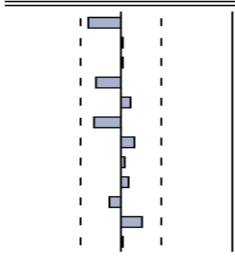
Source: Prepared by researchers based on EViews 12

5-2- The simple and partial autocorrelation function of the remainders :

We note that the remainders of the model are stable, and this is because the columns of the simple and partial autocorrelation functions of the remainder s are all within the confidence interval.

Table 7: Autocorrelation function for remainders

Date: 12/20/22 Time: 00:06
Sample (adjusted): 1994 2020
Q-statistic probabilities adjusted for 4 dynamic regressors



Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
		1	-0.306	-0.306	2.8209	0.093
		2	0.013	-0.089	2.8266	0.243
		3	0.012	-0.012	2.8311	0.418
		4	-0.233	-0.257	4.6779	0.322
		5	0.097	-0.069	5.0120	0.414
		6	-0.259	-0.322	7.5118	0.276
		7	0.116	-0.115	8.0378	0.329
		8	0.032	-0.094	8.0811	0.426
		9	0.067	0.031	8.2776	0.506
		10	-0.109	-0.274	8.8238	0.549
		11	0.194	0.117	10.662	0.472
		12	0.015	0.029	10.673	0.557

*Probabilities may not be valid for this equation specification.

Source: Prepared by researchers based on EViews 12

5-3- Test of autocorrelation and stability of variance for the remainders:

We note from the two tables that all probabilities for the F test are greater than 0.05, and therefore we accept the null hypothesis in the two tests at a significance level of 5%, and according to the (LM test), there is no serial autocorrelation of errors, and according to the (ARCH) test, we recognize the stability of variance.

Table.9: Results of the autocorrelation test and stability of variance for the **Source:** Prepared by researchers based on EViews 12

We note that the CUSUM of Squares test touches one of the two boundary lines of the critical region, but it soon returns to stability within the critical region; It is clear from these two tests that there is stability and harmony in the model between the long-term results and the short-term results.

5-6 Testing the suitability of the Ramsey Reset Test*:*

We note from the table that all probabilities for the F and T tests are greater than 0.05, and therefore we accept the null hypothesis in the two tests at a significant level of 5%, meaning that the model is correctly defined

Figure 5. Ramsey Reset Test

remainders.

Heteroskedasticity Test: ARCH

F-statistic	0.131997	Prob. F(1,24)	0.7196
Obs*R-squared	0.142215	Prob. Chi-Square(1)	0.7061

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	2.204891	Prob. F(3,14)	
Obs*R-squared	8.663547	Prob. Chi-Square(3)	

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: PIBH PIBH(-1) PIBH(-2) PIBH(-3) PIBH(-4) BP BP(-1) BP(-2) BP(-3) BP(-4) C

	Value	df	Probability
t-statistic	0.432251	16	0.6713
F-statistic	0.186841	(1, 16)	0.6713
Likelihood ratio	0.313468	1	0.5756

Source: Prepared by researchers based on EViews 12

6. CONCLUSION

▪At the end of this research paper, through which we tried to study the impact of the budget deficit on economic growth by analyzing the relationship between them in Algeria, through the econometric study that we applied using the Autoregressive Distributed Lag/ARDL model. The results of the stability test of the Philippe Peron "PP" test showed that the time series used in the model are integrated of degree I (1), which allowed the possibility of applying the co-integration approach using the ARDL model; After using ARDL (4.4), the results of the study showed the following:

▪* Testing the limits and the existence of a long-term complementary relationship represented in the error correction coefficient, which allowed the treatment of short-term errors by 9.9% in the long-term for each year.

▪* The results of estimating a long-term model showed an inverse relationship

between the general budget balance and economic growth in the short term, and a soft relationship between them in the long term; While the results of the validity tests of the model proved that it is possible to rely on the results of the long-term and short-term parameters for the correct diagnosis.

The study recommends the following:

▪Emphasizing the importance of structural reforms undertaken by the state, achieving efficient public spending, prioritizing public spending, emphasizing the importance of legislative and institutional reforms, and activating oversight at all different levels of government;

▪Diversifying the national economy and creating opportunities for the rule of economic activities of a productive nature, by working on the rational use of oil resources, as well as using surplus revenues to establish a sovereign fund to pay off public debt; In addition to the benefits arising from it, as it is resorted to in crises;

Endeavoring to make the tax system work efficiently, and to make it a system capable of guaranteeing an insignificant tax revenue, provided that taxes do not affect the poor classes.

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