Green Inflation: International Journal of Management and Strategic Business Leadership

E-ISSN : 3048-0612
P-ISSN : 3048-0620

Research Article

The Effect of the Correlation of Public Debt on Some Indicators of Economic Stability in Iraq for the Period (2004-2023)

Eman Mudhafar Yousif

[1] College of Administration and Economics, Wasit University; e-mail : iyousif@uowasit.edu.iq
***** Corresponding Author : Eman Mudhafar Yousif

Abstract: This research investigates the correlation between public debt and several indicators of economic stability in Iraq for the period from 2004 to 2023. It analyzes the development of both internal and external public debt in the Iraqi economy during this period and examines the relationship between public debt (internal and external) and key economic indicators, such as the Gross Domestic Product (GDP) and the inflation rate. The study utilizes standard statistical methods to analyze these relationships and provide a comprehensive overview of the effects of public debt on economic stability. The findings highlight a negative and significant impact of the growth rate of public debt on the inflation rate, both in the short term and long term, suggesting an inverse relationship between them. Similarly, the analysis shows a negative and significant effect of public debt growth on the unemployment rate, both in the short and long run, again indicating an inverse relationship. The study further discusses how the Iraqi government's growing dependence on public debt, particularly external debt, can have an impact on the nation's economic policies. These results emphasize the complex dynamics between public debt and economic stability in Iraq, demonstrating how changes in debt levels can influence inflation and unemployment rates. The research underscores the need for effective debt management strategies to maintain economic stability and promote sustainable growth. Additionally, the findings suggest that public debt, if not managed carefully, can undermine key economic indicators and hinder the long-term stability of the economy, making it crucial for policymakers to consider the balance between debt levels and economic health.

Keywords: Economic; Inflation; Output; Public; Stability

1. Introduction

The issue of public debt is one of the most important economic problems that it suffers, including most of the economies of the developed and developing countries of the world, and Iraq is one of the countries that suffer from the development of the size of the public debt resulting from financial imbalances that may deepen structural imbalances in most sectors, economic, as a result of mismanagement of resources. , physical and human, as well as lack of development, technology in all joints, those sectors, economic, which caused an increase in dependence on revenues, oil very significantly in the financing, the general budget, the federal with neglect of other sectors, production, and as a result it is vulnerable to external shocks as well as price fluctuations, Oil, which seriously affects the public revenues of the state that finances the general expenditures of the state.

1.1. Importance of research

The importance of research lies through the study, the phenomenon of debt, public and a cycle in achieving stability, economic and political Iraq, as the debt, public impact in raising the standard of living, and well-being of members of society, and the future of current

Received: 19 June, 2025;
Revised: 16 July, 2025;
Accepted: 02 August, 2025;
Published: 05 August, 2025;
Curr. Ver.: 05 August, 2025

generations, and the future, through the increase of investments, large in the economies of countries that depend on such a resource, financial.

1.2. Search problem

Most developing countries, including Iraq, suffer from the problem of public debt (internal and external), as Iraq is a rentier country on the one hand, and on the other hand, Iraq has been exposed to more than one crisis, political and military, which increases the risks of the adverse effects of the accumulation of debt, public on stability, economic represented in the output, domestic and inflation in Iraq, as well as the absence of planning., proper and the spread of corruption, administrative, and financial.

1.3. Research hypothesis

The research proceeds from the premise that the effects of religion, public (internal, external) on the variables of stability, economic vary according to the circumstances, economic in Iraq on the one hand, and on the other hand, the difference in time period, which requires taking into account the direction and burdens, public debt when designing and implementing, economic policies in Iraq.

1.4. Research Objective

The research aims to study the nature of the relationship, between religion, public and some variables of stability, economic in Iraq by identifying the conceptual aspect of religion, public and stability, economic, and then indicate the extent of the impact of debt, public (internal, external) in some indicators of stability, economic represented (domestic product, Gross and inflation) in Iraq for the period (2004-2023).

2. Conceptual framework of public debt and economic stability

2.1. The conceptual framework of public debt

2.1.1. The concept of public debt

Public debt is an important source of revenue, public and resorted to by most different countries, developed and developing, to finance financial deficits in the public budget, especially when the deficit of revenues, public to finance spending, public, and several definitions have appeared in the literature of economic and financial thought, including it is) "a cash amount, borrowed by the government or any public person from individuals or institutions, private or public financial or from other countries, under an agreement, based on its legitimacy to a general legal rule issued by the legislative authority that includes the fulfillment, undertaking to pay and pay, interest on it in accordance with the terms of the agreement" (Al-Qadi, 2014: 119), as defined as "debt, public is the balance, total of governmental, direct contractual obligations,Fixed term towards others, i.e. debts units, government contained, in financial statistics, government, which includes both government, central including samples, service and administrations, finance" (Abdel Moaty, 2016: 115), the World Bank defined public debt as "a set of money obtained by the state from the market.",

external or internal, and undertakes to refund and pay interest on it according to certain conditions" (Obeid, 2017: 158).

2.1.2. Public Debt Jobs

Three functions, basic to religion, can be identified as follows:

a. Function, stability: The government is responsible for achieving economic stability, especially in times of crisis experienced by the country, and therefore the public budget should not be balanced, instead the fiscal policy needs to contribute to growth. Reducing the government's debt by reducing public expenditures, which leads to signs of economic recovery (Mohammed, 2020: 80).

b. Function, Empowerment: It is to achieve the goal of empowerment, taxation, and that harmony, necessary in the policy, economic, in order to build activity, investment to achieve growth, economic, and, employment, because of the great importance in the determination, long-term, taxes through which to create, an atmosphere of confidence that the owners of Projects, planning, calculation, investments, long-term, (Fatlawi and Moussawi, 2019: 273).

c. Burden sharing function: It occurs when the amounts spent at the present time accrue to current and future generations, that is, the distribution of tax burdens to generations over time, and taxpayers should not pay the costs, total in duration, of such governmental activities, but the taxpayers must, Future contributors also contribute in line with the benefits they received from the expenses of the previous period (pay by use, and this function, represented (investments, general) which increases efficiency, economic in the term, Tawil (23-22: 2016, Carl-Ludwig Holtfrerich and others).

2.2. The Conceptual Framework for Economic Stability

2.2.1. The concept of stability, economics

Stability, macroeconomic is one of the objectives of the policy, general economic, of the state, and consists of two elements, two main are: the general level, prices, and employment, full, and in a way any country is judged as stable, or not, and its importance lies in stability, economic that it works to avoid the occurrence of problems, economic (unemployment, inflation), and the search for appropriate measures and ways to confront these problems (Kaabi and Al-Bayati, 2022: 535), and defines stability, also economic ("Achieving employment, full in resources as, economic as available, avoiding large changes, as at the level as the general, of prices, and maintaining a growth rate, real in output, national"). (Salama, 2015: 252).

2.2.2. Stability variables, economics

A set of economic variables were relied upon, which represent some variables of macroeconomic stability, including:

a. Growth, Economic: Economic growth is one of the main goals of the economy that all countries of the world seek to develop their economies and achieve higher levels of growth, domestic product, gross domestic product, and economic growth, defined as ("a continuous increase, in gross domestic product, real or gross output, real national in order to achieve an increase in average, real GDP per capita" (140: 2001, Michael, William), and annual economic growth of output, domestic occurs if the real GDP in the current year is higher than GDP, GDP, In the previous year, the rise and fall in economic growth rates often express the improvement or deterioration of economic activity, and GDP means gross domestic product ("the value of goods produced, services sold in the market and produced by the community or economy, local in a certain period of time, usually a year"), that the measure of output, The real domestic is a more accurate measure of the level, performance and achievement of the economy or for measuring changes in production, the real through which it is possible to achieve knowledge of the level, the real material well-being, obtained or achieved by individuals, society or the state (Samia, 2011, 3-4).
b. Inflation: Inflation is one of the most important economic problems facing developed and developing countries, because it causes economic and social problems that have become inherent to the problem of inflation, including: the problem of unemployment, the high volume of indebtedness, external, deficit in the balance, payments, and there are several definitions of inflation we take one of them, as inflation is defined as ("Rise, continuous in the general level, for prices over a long period of time") (Mandarin, 2012: 489).
c. Unemployment: Unemployment is a global problem because it is an economic and social phenomenon of a global character, in addition to being an economic and social problem for any society, whether it is developed or developing, it deviates from the values and moral standards known for social life, sound, but the problem, unemployment increases in countries, developing, in order to increase pressure on the productive and service sectors, as well as its effects on economic and social life. Unemployment means ("the lack of opportunities to work for a person who wishes to work, in a certain field consistent with his experience and ability"), and unemployment is also defined as ("the compulsion of a part of the economically productive work to an emergency stop, despite the ability and desire to work, and production") (Al-Shammari, 2009: 289).

3. Theoretical description of the model used

3.1. Description of Standard Model Variables

The researcher used the variable of the growth rate of public debt (X) as an independent variable to study the extent of its impact on the gross domestic product (GPD) (y1) as well

as the inflation rate (y2) as well as the unemployment rate (UR) (y3) as these variables were used as dependent variables, as this was done through the program (9 Eviews).

3.1.1. Sleep test for time series:

The stillness test reflects the extent to which the phenomenon of false deviation in standard models can exist or not, derived from the presence of the unit root (Unit root) in the time series data of the studied variables and play their role by taking measures to address the time series to make them static through the first difference and the second difference, and thus get rid of the false deviation in the time series, and from this point of view the time series is static if it is characterized by statistical characteristics as follows [1]:

a. The arithmetic mean of the values studied is constant over time, i.e. .(E[yt]=μ)
b. The variance of the studied values is constant over time, i.e.
c. The value of covariance between two periods must be based on the time gap between them and not on the actual value of time, and the covariance is calculated according to the following formula:

$$\gamma_k = E[(Y_t - \mu)(Y_{t+k} - \mu)]$$

There are several tests to find out the stillness of time series, but the most important and common among researchers on a large scale is the Dickie Fuller test.Dickey- Fuller test,1979)) and the Phelps Perron test (Philips-Perron, 1988).

(1) Dickey-Fuller test:

Doing the Dickie-Fuller test to ensure that the time series of the studied variables can remain or not requires three equations as follows [2]:

a. The possibility of a fixed limit and no time direction

$$\Delta Y_t = \mu + \delta Y_{t-1} + \varepsilon_t \ldots . (1)$$

b. The possibility of a fixed limit and time direction

$$\Delta Y_t = \mu + \alpha T + \delta Y_{t-1} + \varepsilon_t \ldots . (2)$$

c. Without fixed limit and general direction $\Delta Y_t = \delta Y_{t-1} + \varepsilon_t \ldots . . (3)$

According to the above equations, the acceptance of the null hypothesis (H0: =1) which means that the time series of the variables studied include the root of the unit, and vice versa the possibility of accepting the alternative hypothesis (H1 : < 1) which means the time series of the studied variables are still, and the Dickey-Fuller test is verified by comparing the calculated value Tau with a critical value at a significant level (%10, %5, %1)[1].

In 1981, Dickie-Fuller developed a unit root test, later called the Dickie-Fuller Extended Test, using a slow-down variable within the interpreted variables to reach the result that addresses the weak point of the simple Dickey-Fuller test of the problem of autocorrelation in error, which makes it more accurate and efficient than the simple Dickey-Fuller test, and the Cocky-Fuller Extended Test can be illustrated through the following equation [2]:

$$\Delta Y_t = \delta Y_{t-1} + \sum_{i=1}^{n} \theta_i \Delta Y_{t-i} + \varepsilon_t \ \ldots\ldots\ldots (4)$$

3.1.2. Joint Integration Test:

The idea of co-integration is based on the economic concept of statistical properties of time series.

The model states that the economic variables that economic theory assumes a long-term equilibrium relationship between them do not diverge from each other significantly and this divergence from equilibrium is corrected by economic forces that work to return these economic variables to move towards long-term equilibrium. Thus, the idea of joint integration simulates the existence of a long-term equilibrium that the economic system devolves to. The most important standard methods used to test the co-integration of time series are the Engel-Kranger methodology.

3.2. Angel-Kranger methodology

3.2.1 This methodology includes two main phases:

After conducting the Unit Root test , it is first verified that the variables are integrated of the same degree by using tests such as the ADF or PP test and must be unstable at level (I(0) but become stable after the first difference (I(1).

a. Estimating the long-term relationship by estimating the linear regression equation between variables.
b. Test the stability of the residual as it is applied to ensure the stability of the residual in the case of rejection of the hypothesis of the existence of the root of the unit, it indicates the existence of a common integration between the variables.

4. Measuring relationships with public debt and economic stability

4.1. Studying the relationship between the growth rate and GDP

4.1.1. Sleep test for variables:

The dorm test aims to examine the properties of the time series of each of the variables under study, ensure the stillness of the time series of economic variables, and determine the rank of dormancy of each variable.

4.1.2. Test the stability of variables:

The dorm test aims to examine the properties of the time series of each of the variables under study (the independent variable growth rate and the dependent variable GDP) and determine the rank of each variable through some dormant tests as well as the graph of the variables.

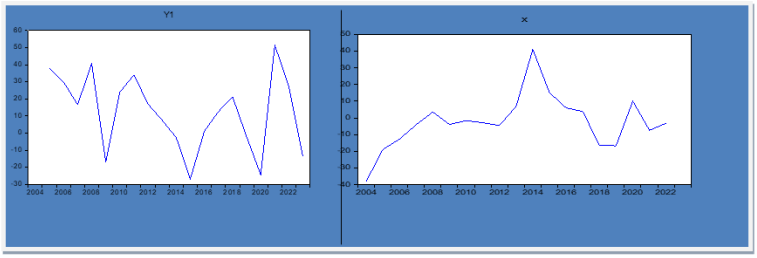

Figure 1. Graph of stability of variables.

The stillness test aims to examine the properties of the time series for each of the variables under study (X) and (y1) and to ensure the stillness of the time series of economic variables and determine the rank of stillness of each variable, through the graph of variables we note that the variables are unstable and to find out the degree of stability we move to the Cocky - Fuller Extended Test (ADF).

4.1.3. Extended Dickie_Fuller Test (ADF) for model variables:

It is noted from the results of Table (1) that the variable (SOPHEN APARTMENT) be static at the first difference (with a fixed limit) and (the presence of the fixed limit and the general direction) i.e. the presence of the root of the unit in the plane, and this is indicated by the values of Tau calculated that was greater than the critical values at a significant level (1%, 5%, 10%) which indicates the possibility of accepting the alternative hypothesis that confirms that the time series are free from the root of the unit and therefore static, and show the results of the variable (GDP) that it is static at the first difference (with a fixed limit, a fixed limit and the general direction - without the fixed limit and the general direction) i.e. the absence of the unit root in the first difference and this is indicated by the values of Tau calculated that were greater than the critical values at a significant level (1%, 5%, 10%) and thus the possibility of accepting the alternative hypothesis that confirms that the time series are free from the root of the unit with the first difference and thus its stillness.

Table 1. Results of Dickie Fuller Time Series Data Test.

Degree of dormancy	p- value	Calculated values of (t) At the level	Level	Variables
I(0)	0.040	3.157	Intercept	X
	0.212	2.806	Trend& intercept	
	0.002	3.311	None	
I(0)	0.017	3.608	Intercept	GDP(y1)
	0.047	3.739	Trend& intercept	
	0.001	3.438	None	

4.1.4. Study the relationship between the growth rate of public debt and GDP:

After studying the stability of the data, it is necessary to develop the appropriate model to study the relationship between the growth rate of public debt and GDP, through the graph as well as the Cocky-Fuller Extended Test (ADF), it was found that the data are stable in level for the independent variable as well as the dependent variable, which indicates the use of the joint integration test using the Angel Kranger methodology, which is based on two stages.

First: Estimating a simple linear model using the least squares method as shown in Table (2).

Second: extracting the residues and testing their stability.

Table 2. shows the relationship between the growth rate of public debt and GDP.

Dependent Variable: Y1
Method: Least Squares
Date: 07/13/25 Time: 04:12
Sample (adjusted): 2005 2022
Included observations: 18 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.61233	4.799934	2.835940	0.0119
X	-0.761167	0.352847	-2.157218	0.0465

R-squared	0.225316	Mean dependent var	13.83967
Adjusted R-squared	0.176898	S.D. dependent var	22.44089
S.E. of regression	20.35949	Akaike info criterion	8.969410
Sum squared resid	6632.140	Schwarz criterion	9.068340
Log likelihood	-78.72469	Hannan-Quinn criter.	8.983051
F-statistic	4.653589	Durbin-Watson stat	2.246399
Prob(F-statistic)	0.046541		

The value of the coefficient of determination was (0.225 =) meaning that (22%) of the growth rate of public debt affects the gross domestic product (R^2GDP) and that the rest is attributed to random errors and the value of (78%) As for the amount of impact of the growth rate has reached (0.761 -) meaning that there is a decrease in GDP by one unit and because this regression relationship represents the long-term relationship and then the rest is tested in the case of stability in the level indicates the existence of joint integration As shown in Table (3).

Table 3. shows its residual stability

Null Hypothesis: E has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Problem.*
Augmented Dickey-Fuller test statistic		-3.522406	0.0214
Test critical values:	1% level	-3.920350	
	5% level	-3.065585	
	10% level	-2.673459	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Null Hypothesis: E has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Problem.*
Augmented Dickey-Fuller test statistic		-3.980196	0.0329
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Null Hypothesis: E has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=3)

		t-Statistic	Problem.*
Augmented Dickey-Fuller test statistic		-4.611357	0.0001
Test critical values:	1% level	-2.708094	
	5% level	-1.962813	
	10% level	-1.606129	

*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17

It is clear from Table (4) that the remainder of the model is stable at the level, i.e. the absence of a root alone, and this means rejecting the null hypothesis and accepting the alternative hypothesis, so it can be said that there is a common integration, meaning there is a short-term relationship between the growth rate of public debt and GDP, then the error correction model can be estimated and know the relationship in the short term, as shown in Table (4) The existence of a short-term relationship between the independent variable (the growth rate of public debt) and the dependent variable (domestic product). The total (GDP)) because the error correction coefficient is negative and significant, as its value (113.33%) of the imbalance occurring at a rate of GDP has been corrected.

Table 4. shows the estimate of the short-term relationship according to the error correction model.

Dependent Variable: D(Y1)
Method: Least Squares
Date: 07/13/25 Time: 04:20
Sample (adjusted): 2006 2022
Included observations: 17 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.820936	5.159602	-0.159108	0.8759
D(X)	-0.611750	0.349319	-1.751266	0.1018
E(-1)	-1.133359	0.264470	-4.285401	0.0008

R-squared	0.590383	Mean dependent var	-0.642940
Adjusted R-squared	0.531867	S.D. dependent var	31.01983
S.E. of regression	21.22386	Akaike info criterion	9.106914
Sum squared resid	6306.329	Schwarz criterion	9.253952
Log likelihood	-74.40877	Hannan-Quinn criter.	9.121530
F-statistic	10.08914	Durbin-Watson stat	2.091072
Prob(F-statistic)	0.001935		

We conclude from the relationship that there is a significant negative effect of the growth rate of public debt on GDP in the long term with a value of (-0.761), meaning that the relationship is inverse in the sense that when the growth rate of public debt decreases, the GDP increases, and this is identical to economic theory. As for the impact in the short term, it had a negative moral impact with a value of (-0.611) meaning that the relationship is inverse in the sense that when the growth rate of public debt decreases, the gross domestic product increases and this is identical for economic theory.

4.2. Studying the relationship between the growth rate of public debt and the rate of inflation

Through Table No. (5), which shows the stability of the variables for both the growth rate of public debt and the inflation rate, as it was found that the variable of the growth rate of public debt is stable at the level, unlike the variable dependent on the inflation rate and stable at the first difference, which indicates the use of the ARDL methodology to measure the impact and know the relationship in the short and long term as follows:

Table 5. shows the estimate of the short-term relationship according to the error correction model.

Degree of dormancy	p-value	Calculated values of (t) At the Level	1st different	p-value	Calculated values of (t) At the level	Level	Variables
I(0)			Intercept	0.040	3.157	Intercept	X
			Trend& intercept	0.212	2.806	Trend& intercept	
			None	0.002	3.311	None	
I(1)	0.105	2.659	Intercept	0.533	1.456	Intercept	Inflation rate (y2)
	0.002	5.551	Trend& intercept	0.279	2.615	Trend& intercept	
	0.004	3.164	None	0.103	1.588	None	

4.2.1. Bounds Test for time series:

The test of the possibility of a long-term equilibrium relationship between the independent variable (the growth rate of public debt) and the dependent variable (inflation rate), which is done through a comparison between the statistical value (F) calculated with the upper and lower limits, if the calculated statistical value (F) is greater than the upper limit of critical values, we accept the alternative hypothesis that provides for the possibility of a long-term equilibrium relationship, but if the statistical value (F) calculated less than the minimum critical values accept the hypothesis of nothingness, which states the lack of common integration between the variables under study, after studying the bounded test (Bounded Test) show that the value of the statistical (F) calculated equal to (33.146 (and this indicates that

it is greater than the upper limit of critical values at the level (10%, 5%, 2.5%, 1%) any meaning accept the alternative hypothesis of the existence of a long-term equilibrium relationship.

Table 6. shows the estimate of the short-term relationship according to the error correction model.

ARDL Bounds Test

Date: 07/14/25 Time: 03:18

Sample: 2008 2022

Included observations: 15

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	33.14614	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

4.2.2. Estimation of the error correction model and the short and long-term relationship according to the ARDL model

The determination of the short and long-term relationship between the growth rate of public debt and the inflation rate will be done by estimating the error correction model, which represents the second step of the ARDL model , which represents the variable of the growth rate of public debt ( ) at the level and the variable of the inflation rate ( ) with the first difference with the addition of the error correction limit for the period of one time slowdown and symbolized by the symbol ( ) and with a negative expected value and smaller than the correct one ( ) as it represents the speed of adaptation of the short-term balance towards long-term equilibrium, is an estimate of the long-term and short-term relationship For the estimated model as well as the error correction parameter of the model (xy_2 〖ECT〗 _(t-1) 0>ꝫARDL) of the important things after the certainty of the existence of a short and long-term equilibrium relationship, as it is noted through Table ( ) that there is a short-term

relationship between the independent variable (the growth rate of public debt (x)) and the dependent variable (inflation rate ( )) because the error correction coefficient is negative and significant as its value was corrected (y_279.06%) of the imbalance in the inflation rate, as we can infer the results of short-term and long-term relationships to the impact of the growth rate of public debt on the inflation rate as follows:

a. The existence of a negative and significant impact in the short term, as the value of the growth rate of public debt (-0.067), which indicates an inverse relationship between the growth rate of public debt and the rate of inflation in the Iraqi economy, meaning in the event of a decrease in the growth rate of public debt by (6%), it leads to an increase in the inflation rate with a significant significance of (0.009). As shown in Table (6).

b. The existence of a negative and moral impact of the growth rate of public debt on the rate of inflation during the long term, as the value of the impact reached (-0.253), and this means that the low rate of growth of public debt leads to an increase in the inflation rate, meaning that the relationship is inverse between them at a significant level (0.0320) as shown in Table (6).

Table 7. Short and long-term relationships and error correction.

ARDL Cointegrating And Long Run Form
Dependent Variable: Y2
Selected Model: ARDL(1, 4)
Date: 07/14/25 Time: 03:25
Sample: 2004 2023
Included observations: 15

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X)	-0.067010	0.046780	-1.432436	0.0099
D(X(-1))	0.077799	0.048040	1.619460	0.1440
D(X(-2))	0.031829	0.051324	0.620149	0.5524
D(X(-3))	0.066500	0.060843	1.092981	0.3062
CointEq(-1)	-0.790671	0.114406	-6.911094	0.0001

Cointeq = Y2 - (-0.2536*X + 3.1528)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	-0.253577	0.097804	-2.592703	0.0320
C	3.152765	0.706996	4.459383	0.0021

4.2.3. Stability test for the ARDL model estimated

The structural stability test for the ARDL model is one of the most important tests in order to ensure that the data used in the study are free of any structural changes in it, using the cumulative sum test of the remaining residual (CUSUM) as well as the cumulative sum of the residual squares (CUSUM sum of squares).), and these two tests are one of the most

important tests in this field because it clarifies two things, namely showing the existence of any structural change in the data and the stability and harmony of long-term parameters with short-term parameters and many studies have shown that such tests always find accompanying the ARDL methodology , if the graph for each of the two tests (CUSUM) (CUSUM SQ) within the framework of critical limits at the level of (0.05) according to the time frame accept the null hypothesis, which states that all the estimated parameters are stable, as in Figure (2).

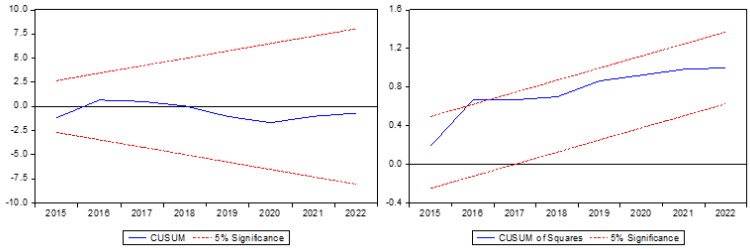

Figure 2. Cumulative Total of Continuous Residues (CUSUM) (CUSUMSQ).

4.3. Studying the relationship between the growth rate of public debt and the unemployment rate

Through Table No. (8), which shows the stability of the variables for both the growth rate of public debt and the inflation rate, as it was found that the variable of the growth rate of public debt is stable at the level, unlike the variable dependent on the unemployment rate and stable at the first difference, which indicates the use of the ARDL methodology to measure the impact and know the relationship in the short and long term as follows:

Table 8. Results of Dickie Fuller Time Series Data Test.

Degree of dormancy	p-value	Calculated values of (t) At the level	1st different	p-value	Calculated values of (t) At the level	Level	Variables
I(0)			Intercept	0.040	3.157	Intercept	X
			Trend& intercept	0.212	2.806	Trend& intercept	
			None	0.002	3.311	None	
I(1)	0.371	1.784	Intercept	0.838	0.617	Intercept	Unemployment rate(Y3)
	0.000	9.911	Trend& intercept	0.579	1.955	Trend& intercept	
	0.000	6.680	None	0.937	1.247	None	

4.3.1. Bounds Test for time series

The test of the possibility of a long-term equilibrium relationship between the independent variable (public debt growth rate) and the dependent variable (unemployment rate), which is done by comparing the statistical value (F) calculated with the upper and lower limits, if the calculated statistical value (F) is greater than the upper limit of critical values, we accept the alternative hypothesis that provides for the possibility of a long-term equilibrium relationship, but if the statistical value (F)) calculated less than the minimum critical values accept the hypothesis of nothingness, which states the lack of common integration between the variables under study, after studying the bounded test (Bounded Test) found that the value of the statistical (F) calculated equal to (14.633 (and this indicates that it is greater than

the upper limit of critical values at the level (10%, 5%, 2.5%, 1%) any meaning accept the alternative hypothesis of the existence of a long-term equilibrium relationship.

Table 9. Results of Dickie Fuller Time Series Data Test.

ARDL Bounds Test

Date: 07/14/25 Time: 05:27

Sample: 2005 2022

Included observations: 18

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	14.63317	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

4.3.2. Estimation of the error correction model and the short and long-term relationship according to the ARDL model

The determination of the short and long-term relationship between the growth rate of public debt and the unemployment rate will be by estimating the error correction model, which represents the second step of the ARDL model , which represents the variable of the growth rate of public debt ( ) at the level and the unemployment rate variable (xy3) with the first difference with the addition of the error correction limit for a period of one time slowdown and symbolized by the symbol ( ) and with a negative expected value and smaller than the correct one ( ) as it represents the speed of adaptation of the short-term balance towards long-term equilibrium, the estimate of the long relationship And the short-term of the estimated model as well as the error correction parameter of the model (〖ECT〗 _(t-1) 0>ɻARDL) is important after the certainty of the existence of a short-term and long-term equilibrium relationship, as it is noted through Table ( ) that there is a short-term relationship between the independent variable (the growth rate of public debt (x)) and the dependent variable (unemployment rate (y3)) because the error correction coefficient is negative and significant as its value has been corrected (66.8%) of the imbalance in the unemployment rate, as we can infer the results of short-term and long-term relations of the impact of the growth rate of public debt on the unemployment rate as follows:

The existence of a negative and significant effect in the short term, as the value of the growth rate of public debt (-0.043), which indicates an inverse relationship between the growth rate of public debt and the unemployment rate in the Iraqi economy, meaning in the event of a decrease in the growth rate of public debt by (4%), it leads to an increase in the unemployment rate with a moral significance of (0.031). As shown in Table (9).

The existence of a negative and moral impact of the growth rate of public debt on the unemployment rate during the long term, as the value of the impact reached (-0.064), and this means that the low growth rate of public debt leads to an increase in the unemployment rate, meaning that the relationship is inverse between them at a significant level (0.029) as shown in Table (9).

Table 10. Results of Dickie Fuller Time Series Data Test.

ARDL Cointegrating And Long Run Form

Dependent Variable: Y3

Selected Model: ARDL(1, 0)

Date: 07/14/25 Time: 05:30

Sample: 2004 2023

Included observations: 18

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X)	-0.043003	0.034471	-1.247509	0.0313
CointEq(-1)	-0.668206	0.122924	-5.435938	0.0001

Cointeq = Y3 - (-0.0644*X + 13.0307)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X	-0.064355	0.046839	-1.373973	0.0296
C	13.030726	0.631753	20.626301	0.0000

4.3.3. Stability test for the ARDL model estimated

The structural stability test for the ARDL model is one of the most important tests in order to ensure that the data used in the study are free of any structural changes in it, using the cumulative sum test of the remaining residual (CUSUM) as well as the cumulative sum of the residual squares (CUSUM sum of squares).), and these two tests are one of the most important tests in this field because it clarifies two things, namely showing the existence of any structural change in the data and the stability and harmony of long-term parameters with short-term parameters and many studies have shown that such tests always find accompanying the ARDL methodology , if the graph for each of the two tests (CUSUM) (CUSUM SQ) Within the framework of critical limits at the level of (0.05) according to the time frame we accept the null hypothesis, which states that all estimated parameters are stable, as in Figure (3).

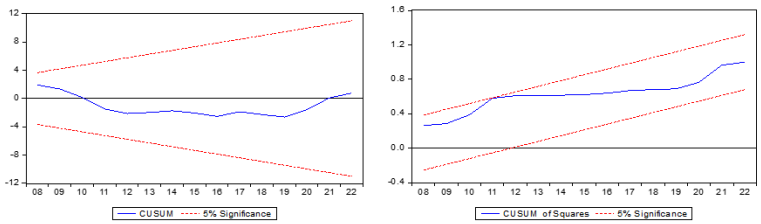

Figure 3. Cumulative Total of Continuous Residuals (CUSUM) (CUSUMSQ)

5. Conclusion and Recommendations

5.1. Conclusion

Iraq suffers from a problem, increasing public debt (internal and external), and this was clearly shown, after (2015), due to the entry of Iraq into more than one political and military crisis, as a result of Iraq's exposure to a double shock, namely the war, against ISIS, and the decline in the prices of crude oil in the global market, which led to a decrease in revenues, the budget, the federal, and directing financing to the consumer sectors instead of the productive sectors.

The Iraqi economy suffers from imbalances, structural, structure, destructive productivity, due to Iraq's exposure to exceptional circumstances, namely fighting major wars and sanctions, economic that extended for more than (13) years, so the Iraqi economy became an economy, rentier represented by crude oil.

In most cases, Iraq did not resort to public debt (internal and external) in order to achieve an economic growth rate and achieve stability, but because of the wars and crises it went through.

There is a negative significant impact of the growth rate of public debt on GDP in the long term with a value of (-0.761), meaning that the relationship is inverse in the sense that when the growth rate of public debt decreases, GDP increases, and this is identical to economic theory. As for the short-term impact, it had a negative moral effect with a value of (-0.611), meaning that the relationship is inverse, meaning that when the growth rate of public debt decreases, GDP increases.

The existence of a negative and significant impact in the short term, as the value of the growth rate of public debt (-0.067), which indicates an inverse relationship between the growth rate of public debt and the rate of inflation in the Iraqi economy, meaning in the event of a decrease in the growth rate of public debt by (6%), it leads to an increase in the inflation rate with a significant significance of (0.009).

The existence of a negative and moral impact of the growth rate of public debt on the inflation rate during the long term, as the value of the impact reached (-0.253), and this means that the low growth rate of public debt leads to an increase in the inflation rate, meaning that the relationship between them is inverse at a significant level (0.0320).

The existence of a negative and moral impact in the short term, as the value of the growth rate of public debt was (-0.043), which indicates an inverse relationship between the growth rate of public debt and the unemployment rate in the Iraqi economy, meaning that if the growth rate of public debt decreases by (4%), it leads to an increase in the unemployment rate with a significant significance of (0.031).

The existence of a negative and significant impact of the growth rate of public debt on the unemployment rate during the long term, as the value of the impact reached (-0.064), and this means that the low growth rate of public debt leads to an increase in the unemployment rate, meaning that the relationship between them is inverse at a significant level (0.029).

5.2. Recommendations

Using public debt amounts (internal and external) in financing spending, productive investment, not consumption, in a way that strengthens infrastructure, infrastructure and the establishment of projects, productivity in order to increase future revenues and use these resources, resources in financing installments, debt service, public, and avoiding the use of public debt amounts in projects that do not achieve profits for the state.

Work to diversify the sources of financing the budget and reduce the percentage of dependence on oil revenues gradually, through the development and development of future to activate and expand the productive sectors and diversify, especially the agricultural and industrial sectors, and expand the tax base, to maximize non-oil revenues and increase their contribution to the financing of the budget.

And work to develop a policy or, an economic strategy for the management of debt, public and reduce the resort to borrowing, internal in cases of necessity, and stay away from borrowing, external except in the presence of extreme necessity represented by disasters, nature, wars, and crises, sudden economic, because borrowing, external usually has negative effects, at the level, economic, political, and social, because of the conditions imposed by states and institutions, creditors.

Work on developing the financial and monetary system in Iraq so that individuals can increase their bank credits, which increases the ability of banks to meet the needs of the state of funds.

The need to combat corruption, financial, and administrative and address waste of money, public, which led to the provision of a surplus of funds to avoid resorting to borrowing or at least reduce its percentage.

The need to work on the adoption and construction of sovereign funds, which Iraq lacks currently, through which the public finance can resort to them in times of low oil prices, in order to avoid the effects of borrowing, on the economy, especially when financing spending, current at the expense of spending, investment, as well as the possibility, investment of those funds in times of non-need, in order to increase the funds of those funds, sovereign.

Funding: This research received no external funding.

Data Availability Statement: All the data used in this article are provided throughout the article.

Conflicts of Interest: The authors declare no conflict of interest.

References

[1] R. Aboul Atta, *Third World Debt: Blindness to the Light of the Provisions of International Law*, Dar Al-Nahda, Egypt, 1988.
[2] M. A. Al-Effendi, *Macroeconomic Theory, Politics and Practice*, Sana'a University, 1st ed., Yemen, 2012.
[3] M. B. Saha, *The Impact of Non-Oil Export Development on Economic Growth in Algeria: A Case Study of Small and Medium Enterprises*, Master's thesis, Faculty of Economics, Commercial and Management Sciences, University of Ghardaia, Algeria, 2011.
[4] M. S. Salameh, *Public Finance Management*, Dar Al-Moataz for Publishing and Distribution, Amman, 2015.
[5] K. T. Al-Shammari, *Introduction to Economics, Micro and Macro Analysis*, Wael Publishing House, 1st ed., 2009.
[6] A. I. Abdel Moaty, *Public Treasury Bills and Bonds: A Comparative Study*, Dar Al-Fikr wal-Qanoon for Publishing and Distribution, Mansoura, Egypt, 2016.
[7] A. A. A. Abdel Latif, *Dollar Exchange Rate Fluctuations and Their Impact on the Economies of Arab Petroleum Exporting Countries (OPEC)*, University Education House, Alexandria, Egypt, 2016.
[8] B. K. Obaid, *Estimating the Impact of Internal Public Debt on the Monetary Basis in the Iraqi Economy for the Period (2006-2015)*, Anbar University Journal of Economic and Administrative Sciences, vol. 9, no. 19, Iraq, 2017.
[9] S. K. S. Al-Fatlawi and S. A. A. Al-Musawi, "Measuring and analyzing the relationship between the development of internal public debt and economic growth in Iraq for the period (1990-2017)," *Journal of Administration and Economics*, University of Karbala, vol. 8, no. 31, 2019.
[10] M. H. Al-Qadi, *Public Financial Management*, Academics for Publishing and Distribution, Jordan, 2014.
[11] M. J. A. Al-Kaabi and Q. M. H. Al-Bayati, "Factors of economic stability in Iraq and the possibility of achieving them according to Keynes's theory with reference to the reality of economic stability internationally," *Journal of Sustainable Studies*, University of Al-Qadisiyah, vol. 4, no. 1, 2022.
[12] M. G. M. Mohamed, "The impact of external debt on economic growth in Egypt, an econometric study," *Journal of the Faculty of Politics and Economics*, Issue 8, Egypt, 2020.
[13] C.-L. Holtfrerich et al., *Government Debt: Causes, Effects and Limits*, German National Academy of Sciences Leopoldina, Berlin, 2016.
[14] W. Boyes and M. Millrind, *Principles of Macroeconomics*, McGraw-Hill Companies Inc., 2001.
[15] C.-L. Holtfrerich et al., "Government Debt: Causes, Effects and Limits," *German National Academy of Sciences Leopoldina*, Berlin, 2016.