Measuring and analyzing the impact of public debt on spending for a year using the ARDL model in Iraq for the period (2004-2020).

The two researchers:

1.Prof.Dr. Nazar Kadhim Sabah Al-Khaykanee.

Email: nazar.sabah@qu.edu.iq

2.Yusra Rasem Jabbar.

Email: admin.ecco21.1@qu.edu.iq

Al-Qadisiyah University, College of Administration and Economics.

Abstract

With the increase in the budget deficit, the borrowing increases with it, and consequently the burden of its services in terms of interest and installments increases from year to year, and Iraq is one of the countries in which the budget deficit leaves a reason for internal and external borrowing, and then increases the burden of public debt by influencing public spending. Public debt has become a preoccupation in Iraq, and it suffers from bearing the accumulation of public debt and the effects that its expansion leaves on the performance of public spending. Therefore, the research aimed to analyze and measure the impact of public debt on public spending in Iraq for the period (2004-2020) using the (Eviews-12) program, and the results showed the absence of a clear impact of public debt (DE) on public spending (EX)) in the long term Due to the presence of other expansionist factors that contributed to the increase in public spending, represented mainly that public spending depends for its financing on revenues from crude oil, and therefore the relationship between public debt and public spending is weak.

Keywords: Iraq, public debt, public spending, ARDL model.

Introduction.

Public debt plays an auxiliary role in development if it is managed and used in an optimal manner that achieves a return that exceeds the cost of borrowing, and

thus the economy is able to meet its obligations. developed, emerging and developing countries, which appeared in the form of large deficits in public budgets and a sharp rise in public debt rates that recorded large levels. In fact, global experiences have always proven that countries with the lowest debt ratio are often more capable and less critical in facing financial crises and sudden shocks. However, as it is known, maintaining an ideal debt level is difficult, due to the increase in public spending in the state, and with the increase in the budget deficit, the borrowing increases with it, and consequently the burden of its services increases from interests and installments from year to year, as these burdens deduct a large part of the expenses The general public, and Iraq is one of the countries in which the budget deficit leaves a reason for internal and external borrowing, thus increasing the burden of public debt.

In view of the foregoing, the issue of public debt and its impact on public spending in general returns to the fore in economic discussions as a proposition that aims to identify the extent to which the financial gap has reached in Iraq, through which it is possible to know the directions of the financial and monetary policies, and therefore the public debt affects public spending.

Research importance:

The importance of the research comes from the importance of the issue of public debt, which is the main concern in a country like Iraq, which enjoys the oil wealth that generates huge oil revenues, and at the same time suffers from continuing to bear the accumulations of public debt, both internal and external, in addition to that this interest is attributed to the trend of deficit In the Iraqi federal public budgets through the impact of the accumulation of public debt on the growth of public spending, which is something that called the researcher to identify the type of relationship between public debt and public spending.

Research problem:

Given what the public debt and its accumulation leave from an increase in fiscal deficits on the one hand, and the impact on monetary and financial variables, especially public spending, the problem of the research is represented in the size of the effects that the expansion of public debt leaves on the performance of public spending.

Research Hypothesis:

The research starts from a main hypothesis that:

The expansion of public debt in its internal and external forms has negative effects on public spending, as it is expected that the relationship will be positive between public debt and public spending.

Research objective:

The research aims to analyze and measure the impact of public debt on public spending in Iraq for the period (2004-2020).

Research Methodology:

In order to achieve the objectives of the research and test its hypotheses, the quantitative method based on measuring the impact of public debt on public spending in Iraq for the period (2004-2020) was relied on.

Research structure:

To achieve the objectives of the research and to verify its hypothesis, the research was divided into:

The first Axis: Essence public debt, public spending.

First: The essence of public debt

Public debt is an important source of public revenue, and various countries, developed and developing alike, resort to it to finance the financial deficits in their public budgets, especially when public revenues are in short supply to finance public spending. As a result of her borrowing these amounts, she financed the deficit in her general budget with her pledge to repay the debt with the interest accruing therefrom after a period according to the conditions for creating this debt (Shalal: 2020: 28). And the government is obligated to pay it according to a specific timetable, and this debt is paid with interest as a financial obligation that the government must restore to the party from which it was borrowed, meaning that it is a balance of government obligations that have different time dimensions (Sadiq and Abdel-Wahhab: 1998: 21).

Several definitions of public debt have emerged, including that it is the sums that the national economy borrows, in which the loan period exceeds one year or more, and is due to the lender through payment or through the national government or through official public bodies as a guarantee for the obligations of individuals and private institutions (Sadiq and Abdel-Wahab: 1998, 231)

The International Monetary Fund defined it as a group of debts contracted or guaranteed by public agencies and paid to residents and non-residents in a foreign country and on their specified maturity date (Al-Ali and Kadawi: 1989, 53).

The types of public debt are of two types: the internal public debt that occurs when the government resorts to borrowing from natural and legal persons inside the country, regardless of their nationality, and this means that the nature of the loans is determined by the place of issuance of the loan, whether borrowing from the banking system or from outside the banking sector, and The external year, and arises as a result of the deficit in local resources or the lack of local savings by covering the need for the required investments on the one hand and the state's need for hard currencies on the other hand, and the financial gaps are covered through the state's resort to external sources of financing by borrowing from individuals residing outside the country or from Governments and International Financial Institutions (Sadiq and Abdel Wahab: 1998, 251).

Second: The essence of public spending

It reflects the role of the state in economic life, and public expenditure is a sum of money that comes out of the government treasury to satisfy public needs, and according to which the government works to perform public services with the aim of achieving welfare for the community (Fawzi: 2000, 41) and some consider it a cash amount spent by a public figure with the aim of Achieving the public benefit (Hashish: 1992, 63), and others see it as a quantity of money decided by the legislative authority and spent by a public person or the executive authority in order to provide public goods and services as well as to strive to achieve various social, economic and political goals (Nased: 2000, 27), or It is a set of expenditures that the government works to spend during a certain period of time to satisfy the needs of the community and work to organize it (Al-Jubouri and Al-Zamili: 2014, 121).

In any case, public spending expresses the size of government intervention and the public burdens, whether from the central government or local governments, and it is one of the aspects of the economic policy approved by the state, and through this it becomes clear that public spending has three features, which are the monetary character of public spending (Nasser: 1975). (46) The general character of public spending and the attribute of achieving public benefit (Al-Mahjoub: 1966, 35-37). There are several divisions of public spending, operational or current spending, and investment spending (Othman: 2008, 285).

The Second Axis: measuring and analyzing the impact of public debt on public spending in Iraq for the period (2004-2020).

First: characterization and formulation of the standard model

That is, employing econometric methods to measure the relationship between public debt as an independent variable, and both money supply and public spending as dependent variables in Iraq for the period (2004-2020) for Iraq, and with (68) observations of the variables, which have been described as follows:

1. Independent variables, including total public debt (DE).
2. Dependent variables, which are determined from within the standard model, and are represented by public expenditure (EX).

In order to formulate the standard model, it must be through the logarithmic formula to express the nature and direction of the relationship between the independent variable (DE) and the dependent variable (EX), according to the following:

$$Log\, EX = a2 + a3Log(DE) + U_1 \dots\dots\dots\dots\dots\dots\dots (1)$$

Economic logic refers to the assumption of a positive (direct) relationship between public debt and public spending, and it is expected that the value of the parameters referred to in equation (1) will be positive, assuming that the issue of changes in public debt contributes to an increase in public spending. The mentioned variables are under research and analysis using modern standard methods through the (ARDL) model, based on the statistical program (Eviews:12).

Second: The results of the dormancy test (unit root test) of the public expenditure equation (EX)

For the purpose of verifying the stability of the time series of the studied variables (DE, EX), and in the light of the expanded Dickey-Fuler test (ADF: Augmented Dickey - Fuller), it is clear from the data of Table (1) that the time series of the mentioned variables were not static at the level, but when Calculating the first difference for those two variables, and it appeared that they were static for the variable (DE) and for two cases, as well as the static series of the variable (EX) at a state (without a fixed limit and a general trend), and with a significant level of less than 10%. By moving to the Phillips- Perron Test presented in Table (2), it is clear that the time series of the variables (DE, EX) were not static at the At Level, and static when calculating the first difference and at a significant level (5% and 10%),

and from it we accept the alternative hypothesis towards the inactivity of the time series for the mentioned variables.

Table (1)

Expanded Dickey Fuller Exam (ADF) Expanded Public Expenditure Equation (EX)

Test Results

UNIT ROOT TEST RESULTS TABLE (ADF)			
Null Hypothesis: the variable has a unit root			
	At Level		
		LOGDE	LOGEX
With Constant	t-Statistic	-0.6012	-2.0900
	Prob.	0.8624	0.2494
		n0	n0
With Constant & Trend	t-Statistic	-2.5416	-1.7838
	Prob.	0.3079	0.7001
		n0	n0
Without Constant & Trend	t-Statistic	1.0218	0.2624
	Prob.	0.9177	0.7588
		n0	n0
	At First Difference		
		d(LOGDE)	d(LOGEX)
With Constant	t-Statistic	-3.0457	-1.8335
	Prob.	0.0361	0.3611
		**	n0
With Constant & Trend	t-Statistic	-3.1374	-2.1422
	Prob.	0.1068	0.5120
		n0	n0
Without Constant & Trend	t-Statistic	-2.8563	-1.9128
	Prob.	0.0050	0.0538
		***	*

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Table (2)

Dickey–Phillips–Perron (P.P) Public Expenditure Equation (EX) Test Results

UNIT ROOT TEST RESULTS TABLE (PP)			
Null Hypothesis: the variable has a unit root			
	At Level		
		LOGDE	LOGEX
With Constant	t-Statistic	-0.2228	-1.7391
	Prob.	0.9295	0.4070
		n0	n0
With Constant & Trend	t-Statistic	-1.9003	-1.0667
	Prob.	0.6428	0.9264
		n0	n0
Without Constant & Trend	t-Statistic	1.3823	0.9793
	Prob.	0.9570	0.9118
		n0	n0
	At First Difference		
		d(LOGDE)	d(LOGEX)
With Constant	t-Statistic	-3.0457	-3.0304
	Prob.	0.0361	0.0375
		**	**
With Constant & Trend	t-Statistic	-3.1374	-3.3045
	Prob.	0.1068	0.0749
		n0	*
Without Constant & Trend	t-Statistic	-2.8563	-3.0687
	Prob.	0.0050	0.0027
		***	***

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Third: Estimation of the Autoregressive Model of Distributed Deceleration ARDL for the Public Expenditure Equation.

Through the results of estimating the ARDL model, which are presented in Table (3), it is clear that they were identical to the statistical and standard tests, and then the

quality of the model, as the value of the coefficient (R^2) was about 99.28%, which means that the independent variable included in the model explains about 99.82% of the change in the dependent variable, and the value of F-Statistic was about (1250.231), and with a significant level less than 0.01, because the value of Prob is 0.000000, in addition to that the value of Dorbin Watson (D.W) reached about (2.103259) to confirm that the model is free from The problem of autocorrelation, as the time lag extends to four time periods with respect to the public expenditure variable (EX) and one time period with respect to the public debt variable, ie (4,1).

Table (3)

ARDL model estimation results for the Public Expenditure Equation (EX)

Dependent Variable: LOGEX
Method: ARDL
Date: 05/29/22 Time: 23:53
Sample (adjusted): 2005Q1 2020Q1
Included observations: 61 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LOGDE
Fixed regressors: C
Number of models evalulated: 20
Selected Model: ARDL(4, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGEX(-1)	1.492251	0.114403	13.04383	0.0000
LOGEX(-2)	-0.478098	0.218963	-2.183460	0.0334
LOGEX(-3)	-0.240904	0.214836	-1.121339	0.2671
LOGEX(-4)	0.215396	0.108191	1.990884	0.0516
LOGDE	-0.256605	0.047123	-5.445424	0.0000
LOGDE(-1)	0.247987	0.046285	5.357766	0.0000
C	0.288595	0.136086	2.120680	0.0386

R-squared	0.992853	Mean dependent var	11.16483
Adjusted R-squared	0.992059	S.D. dependent var	0.377741
S.E. of regression	0.033662	Akaike info criterion	-3.837270
Sum squared resid	0.061189	Schwarz criterion	-3.595039
Log likelihood	124.0367	Hannan-Quinn criter.	-3.742337
F-statistic	1250.231	Durbin-Watson stat	2.103259
Prob(F-statistic)	0.000000		

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Fourth: The boundary test for the co-integration of the public expenditure equation (EX)

It is clear from the examination of the data contained in Table (4) that the calculated statistical value (statistic-F) is greater than the value of the upper limits at the first difference, and the tabular minimum at the level and at the level of significance of 1%, and therefore we accept the alternative hypothesis that states that there is a joint integration between search variables.

Table (4)

Results of the Bound Test for the Public Expenditure (EX) equation.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LOGEX)
Selected Model: ARDL(4, 1)
Case 2: Restricted Constant and No Trend
Date: 05/29/22 Time: 23:57
Sample: 2004Q1 2020Q4
Included observations: 61

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	6.729249	10%	3.02	3.51
k	1	5%	3.62	4.16
		2.5%	4.18	4.79
		1%	4.94	5.58
Actual Sample Size	61	Finite Sample: n=65		
		10%	3.143	3.623
		5%	3.787	4.343
		1%	5.35	6.017
		Finite Sample: n=60		
		10%	3.127	3.65
		5%	3.803	4.363
		1%	5.383	6.033

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Fifth: Error Correction Model (ECM) according to the ARDL Methodology for Public Expenditure Equation (EX).

This model is one of the most important methods that are used to describe the shape of the relationship between economic variables and in the short and long-term time period because it shows the effect of the time regression of the variables included in the model on the same variables, and this model can be applied to small samples unlike previous standard methods that cannot be used In such samples, the error correction vector model requires co-integration in order to be applied, and it is in fact an autoregressive model used to describe the interrelationship between stable variables (Khalaf: 2015, 114), and it is clear from the data in Table (5) that CointEq (1*) or the value of the error correction factor amounted to (−0.011354) and with the availability of the negative and moral condition, the model is heading towards achieving equilibrium in the long term, and from it it is also clear that (1.13% of errors in the short term can be corrected in (one chapter), That is, there is a direct and significant short-term response between the independent variable (DE) and the dependent variable (EX).

Table (5)

The results of the error correction model (ECM) according to "ARDL methodology for the equation of public expenditure (EX).

ARDL Error Correction Regression
Dependent Variable: D(LOGEX)
Selected Model: ARDL(4, 1)
Case 2: Restricted Constant and No Trend
Date: 05/30/22 Time: 00:01
Sample: 2004Q1 2020Q4
Included observations: 61

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGEX(-1))	0.503606	0.111246	4.526943	0.0000
D(LOGEX(-2))	0.025508	0.129839	0.196458	0.8450
D(LOGEX(-3))	-0.215396	0.102580	-2.099782	0.0404
D(LOGDE)	-0.256605	0.041854	-6.130892	0.0000
CointEq(-1)*	-0.011354	0.002482	-4.575526	0.0000

R-squared	0.741404	Mean dependent var	0.016499
Adjusted R-squared	0.722932	S.D. dependent var	0.062799
S.E. of regression	0.033056	Akaike info criterion	-3.902844
Sum squared resid	0.061189	Schwarz criterion	-3.729822
Log likelihood	124.0367	Hannan-Quinn criter.	-3.835035
Durbin-Watson stat	2.103259		

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Sixth: Estimating the long-run relationship of the public expenditure equation (EX)

It is clear by examining the data shown in Table (6) that the independent variable represented by public debt (DE), has no clear effect on the dependent variable represented by public expenditure (EX)) in the long term, and the truth of this can be identified through the value of (Prob) that It amounted to more than (10%), which indicates the insignificance of the relationship between public debt and public spending, due to the presence of other expansionary factors that contribute to increasing public spending, mainly that public spending depends on revenues from crude oil, and therefore the relationship between public debt and public spending It will have little effect.

Table (6)

The results of estimating the long-term relationship according to the (ARDL) methodology for the public expenditure equation (EX)

ARDL Long Run Form and Bounds Test
Dependent Variable: D(LOGEX)
Selected Model: ARDL(4, 1)
Case 2: Restricted Constant and No Trend
Date: 05/29/22 Time: 23:57
Sample: 2004Q1 2020Q4
Included observations: 61

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDE	-0.759038	1.153629	-0.657957	0.5134
C	25.41702	20.95372	1.213008	0.2304

EC = LOGEX - (-0.7590*LOGDE + 25.4170)

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Seventh: Diagnostic Tests for Public Expenditure Equation (EX)

To verify the quality of the model, it must be revealed that the model is free or contains standard problems such as (the problem of self-correlation, instability of homogeneity of milk, from the results of the Bruschi-Godfrey Serial test) for the estimated model presented in Table (7), that The current model under consideration does not suffer from the autocorrelation problem, since the value of (2) is prob. Chi-square reached (0.1858), which is greater than the significant level (0.05).

Table (7)

The results of testing the autocorrelation problem according to the LM test of the public expenditure equation (EX)

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

F-statistic	1.518517	Prob. F(2,52)	0.2286
Obs*R-squared	3.366080	Prob. Chi-Square(2)	0.1858

Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

According to the Heteroskedasticity test, the data in Table (8) indicate that the value of prob.Chi-square (1) was greater than (0.05) and therefore it is not significant. We accept the null hypothesis that states (homogeneity of residuals). And the current model is free from the problem of instability of homogeneity.

Table (8)

The results of testing the variance inconsistency problem of the public expenditure equation (EX).

Heteroskedasticity Test: ARCH

F-statistic	1.105774	Prob. F(1,58)	0.2974
Obs*R-squared	1.122504	Prob. Chi-Square(1)	0.2894

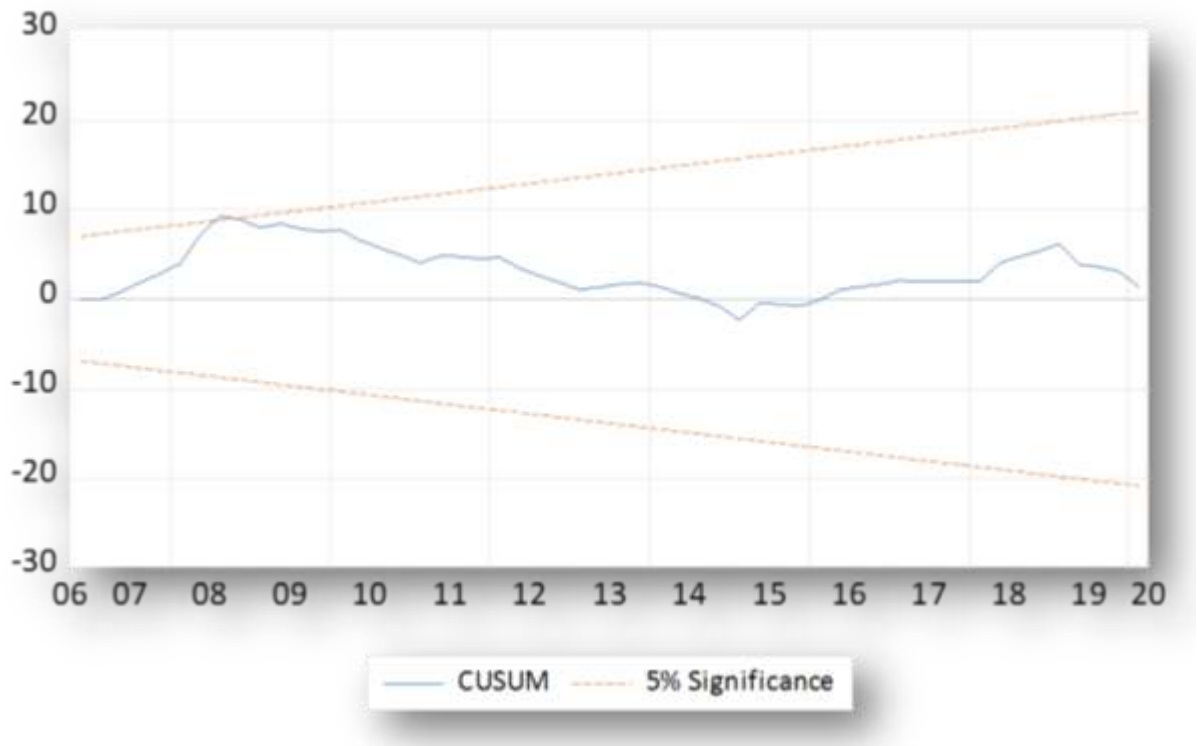
Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Eighth: Stability test for model parameters for the public expenditure equation (EX)

It is clear through the test for the cumulative sum of the residuals (CUSUM), shown in Figure (1) that the estimated line lies within the critical limits and oscillates around the zero value, the upper and lower limits, and at a significant level (5%), so the long and short-term parameters and in light of the statistical test It is considered stable for the estimated model (ARDL).

Figure (1)

The results of the test for the cumulative sum of the residuals (CUSUM) of the public expenditure equation (EX)



Source: Prepared by the researcher based on the statistical program (EVIEWS:12)

Conclusion:

First: the results

1. The results of the expanded Dickey-Fuller test (ADF: Augmented Dickey - Fuller) for verifying the quiescence of the time series of the studied variables (EX, DE) showed that they were static at the first difference and accordingly the ARDL methodology was adopted to estimate the parameters, whether in the long-term or in the short term.
2. The results of estimating the ARDL autoregressive model indicate that the statistical and standard tests, and then their quality, are free from the autocorrelation problem.
3. The results of the limits test for co-integration of the public expenditure equation (EX) showed the existence of a co-integration or an equilibrium relationship between the two variables, and for the purpose of estimating the short-term relationship between the variables using the (ARDL) model, it was found that the value of the error correction coefficient indicates that the model is heading towards achieving balance in the long term.
4. After estimating the long-term relationship according to the (ARDL) methodology of the public expenditure equation (EX), the independent variable represented by public debt (DE), has no clear effect on the dependent variable (EX)) in the long term due to the presence of other expansionary factors that contributed to the increase in spending The public is represented mainly by the fact that public spending depends for its financing on revenues from crude oil, and therefore the relationship between public debt and public spending is weak.

Second: Recommendations

1. It is necessary to restructure public spending and direct it towards achieving economic balance, especially by giving a role to investment spending and then raising the rates of economic growth in Iraq with the adoption of a clear financial policy that will maintain the directions of spending policy and provide appropriate financial allocations in a manner that achieves the objectives of development plans.
2. The necessity of adopting monetary policy the issue of increasing current deposits and influencing making changes in the components of the money supply in order to seek to reduce the increase in the currency in circulation by using its monetary procedures.

3. The need to work on rationalizing and pressing current public spending to match the interest in increasing the volume of public investment spending, which would develop non-oil sectors and find alternative sources of oil revenues, and diversify sources of income.
4. It requires the government to move towards adopting the internal public debt as a proportional tool in financing the budget deficit compared to the external debt and directing it towards the productive sectors, and investing them towards achieving development and paying debts and their benefits, given that external borrowing usually has negative effects on the economic and social level due to the conditions that It may be imposed by the creditor countries and international organizations.
5. Establishing a sovereign fund for the purpose of collecting financial surpluses from oil revenues and benefiting from them in investments, achieving financial sustainability, and developing the resources of the general budget to face the emergency shocks that the Iraqi economy is exposed to, especially since it is a rentier economy affected by fluctuations in oil prices and revenues from it are the main financier of public spending.
6. The necessity of adopting appropriate policies for the public debt by following the principles that include the terms of the loan and how to use it in a manner that ensures the reduction of debt burdens and allows raising its effectiveness in projects that increase investment flows.
7. Continuing to observe the public debt threshold in coordination between fiscal and monetary policy and following up on government performance in raising the efficiency of financial performance by improving the performance of financial institutions, on the one hand, and addressing the deficit in the state's general budget in a way that curbs unjustified borrowing.

Sources:

1. Batoul Al-Jubouri, and Duaa Al-Zamili, The Role of Public Expenditure in Achieving Economic Stability in Iraq (2003-2012) Al-Qadisiyah University, Al-Qadisiyah Journal for Administrative and Economic Sciences, No. 1, Volume 16, 2014.
2. Refaat Al-Mahjoub, Public Finance, Dar Al-Nahda Al-Arabiya for Publishing and Distribution, Cairo University, 1966.
3. Zain Al-Abidin Nasser, The Science of Public Finance, Dar Al-Nahda Al-Arabiya for Publishing and Distribution, 1975, Ain Al-Shams University.

4. Saeed Abdel Aziz Atman, Public Finance, a Contemporary Analytical Approach, University House, Egypt, 2008.
5. Suzy Adly Nashed, Al-Wajeez in Public Finance, New University Publishing House, Alexandria, 2000.
6. Adel Ahmed Hashish, The Basics of Public Finance: An Introduction to the Study of the Fundamentals of Public Financial Art, Arab Renaissance House for Printing, Beirut 1992.
7. Adel Falih Al-Ali, Talal Mahmoud Kadawi, "The Economics of Public Finance", Dar Al-Kutub for Printing and Publishing, Baghdad, 1953.
8. Abdel Moneim Fawzy, Public Finance and Fiscal Policies, Dar Al-Nahda Al-Arabiya for Printing and Publishing, Beirut, 2000.
9. Ali Tawfiq Sadiq and Nabil Abdel Wahab, Monetary Policy and Public Debt Management in the Arab Countries, Research and Discussion Series, Arab Monetary Fund, Seventh Count, Abu Dhabi, 1998.
10. Ammar Hamad Khalaf, Econometrics Applications Using the Eviews Program, 1st Edition, House of Books and Documents, Baghdad, 2015.
11. Ammar Abdul-Hadi Shallal, The Impact of Public Debt on Economic Development, Iraq, a case study, for the period (2006-2017), Anbar University Journal of Economic and Administrative Sciences, Volume 12, Issue 28, 2020.