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Measuring the impact of fiscal policy variables on unemployment rates in Iraq for the period (2004-2023)

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Abstract

The objective of this study is to measure the impact of fiscal policy variables on unemployment rates in Iraq for the period (2004-2023). The research aims to explore both fiscal policy and unemployment, as well as to assess the effect of fiscal policy variables on unemployment rates in Iraq during the specified period. The researcher reached several key conclusions, the most important of which is that government spending affects unemployment rates in the short term by stimulating aggregate demand through increased income for public sector employees. This, in turn, boosts consumption and investment, encouraging businesses to expand and hire more workers. Additionally, spending on public projects (such as infrastructure, healthcare, and education) leads to increased demand for labor in targeted sectors and creates new job opportunities, thereby reducing unemployment.

The main recommendations provided by the researcher include urging fiscal policymakers to focus on sustainable government spending that is not financed by debt, as debt-funded expenditure may lead to higher taxes or inflation, which could negatively impact employment levels in the long term. Adopting a balanced and sustainable fiscal policy grants the economy greater stability and investor confidence, ultimately supporting employment in the long run.

Keywords: Iraq, long run, fiscal policy, unemployment, ultimately supporting employment

Introduction

Fiscal policy plays a significant role in guiding economies toward the desired path of development, both in developed and developing countries. Given the importance of the interrelationship between fiscal policy variables and unemployment rates, this research focuses on measuring the impact of fiscal policy variables on unemployment rates in Iraq during the period (2004-2023). Through this study, light will be shed on the relationship between fiscal policy variables and the unemployment rate in Iraq. The advanced level achieved by developed countries in this area is a reality that cannot be overlooked. Accordingly, the concepts of fiscal variables and unemployment have attracted the attention of many researchers and thinkers, aiming to develop fiscal policy and provide new insights to decision-makers to enhance economic stability, create more job opportunities, and eliminate unemployment.

Government spending can stimulate and foster economic activity, contributing to these goals. The research is structured into three main sections: the first section addresses the methodology and reviews previous studies; the second section explores fiscal policy and unemployment; and the third section presents the measurement and analysis of the impact of fiscal policy on unemployment rates in Iraq.

Section One: Research methodology and previous studies.

Research Problem

Unemployment is one of the most pressing issues that continues to attract the attention of economists. Accordingly, the research problem revolves around the effectiveness of fiscal policy in addressing unemployment through the revenues generated by the state. The core research question can be formulated as follows:

To what extent does fiscal policy affect unemployment in Iraq during the period 2004-2023?

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Research Importance

Governments around the world, regardless of their systems, strive to achieve comprehensive economic and social development. This goal places particular emphasis on fiscal policy, which occupies a central position among economic policies. Understanding how governmental fiscal decisions impact unemployment rates can enhance the ability of policymakers to make informed and effective decisions. This research is thus of value to scholars and decision-makers alike in improving fiscal strategies to combat unemployment.

Research Objectives

The main objectives of this research are

- To explore the concepts of fiscal policy and unemployment.
- To measure the impact of fiscal policy variables on unemployment rates in Iraq for the period (2004-2023).

Research Hypothesis:

Fiscal policy variables are typically represented by public revenues, public expenditures, and the budget balance. Accordingly, the research assumes:

There is a statistically significant impact of fiscal policy variables namely public revenues, public expenditures, and the budget balance on unemployment rates in Iraq, in both the short and long term.

Research Scope

The spatial scope of the research is the Iraqi economy, while the temporal scope covers the period from 2004 to 2023.

Research Structure

To achieve the research objectives, the study is divided into three sections. The first section discusses the methodology and previous studies. The second section addresses the theoretical framework, while the third section is dedicated to the applied analysis of the impact of fiscal policy on unemployment in Iraq.

Previous Studies

Titled “The effectiveness of fiscal policy in reducing unemployment in Iraq after 2003”

This study is based on the hypothesis that fiscal policy in Iraq has a significant impact on economic variables in general, including unemployment. One of the key conclusions drawn by the researcher is that fiscal policy played a relatively effective role in mitigating the rise in unemployment rates in Iraq during the study period, highlighting its importance in addressing this issue. Among the main recommendations, the researcher emphasized the need for the Ministry of Labor and Social Affairs to activate employment offices by issuing bulletins that compile labor demands from both public and private sectors, as well as the available workforce supply, and by taking the necessary measures to facilitate employment opportunities for job seekers.

Titled “Measuring and analyzing the impact of fiscal and monetary policies on unemployment rates in Iraq for the Period (1990-2020)”

This study aimed to empirically investigate the effects of both fiscal and monetary policies on unemployment rates in Iraq during the period 1990-2020. The researchers employed

the Autoregressive Distributed Lag (ARDL) model to construct a framework that includes tools from both policy areas in order to determine the degree of integration and coordination in influencing unemployment rates. The study found a statistically significant inverse relationship between all fiscal policy variables and unemployment in the short term. However, in the long term, GDP and oil revenues were found to have a statistically significant positive relationship with unemployment contradicting standard economic theory. Regarding monetary policy tools, their impact varied: the discount rate was identified as the most influential tool affecting unemployment, while the interest rate was found to have no statistically significant effect. One of the key proposals of the study is to focus on projects that can contribute to reducing unemployment levels by directing domestic credit whether to the private or public sector toward strategic and productive projects capable of absorbing surplus labor and generating economic benefits that stimulate economic growth.

Section Two: Fiscal Policy and Unemployment

First: The concept and objectives of fiscal policy

The Concept of Fiscal Policy

Fiscal policy occupies a prominent position among economic policies in all countries, regardless of their economic philosophies or systems. This importance stems from its vital and effective role in influencing macroeconomic variables. Fiscal policy, whether related to government spending, revenues, or borrowing, is closely tied to the procedures adopted and the tools used by fiscal policymakers.

According to Al-Barwari and Al-Hamwandi (2024, p. 362), the term "fiscal policy" originates from the French word *Fisc*, which means treasury or money chest. Fiscal policy is defined as the government's policy concerning public revenues and expenditures aimed at addressing economic fluctuations, achieving full employment, and ensuring economic stability. In other words, it refers to the role of the government in using taxation and public spending to stabilize prices, ensure full utilization of the society's economic resources, redistribute income, and raise the economic growth rate of the country (Al-Tahmazi, 2023, p. 24) ^[3].

Objectives of Fiscal Policy (Al-A'dhari, 2020, p. 129) ^[7]

1. Achieving Economic Growth

Economic growth can be achieved through the use of fiscal policy tools, particularly by increasing government spending or reducing taxes. More specifically, fiscal policy mobilizes financial resources to provide the necessary funding for economic and social investments.

2. Achieving Full Employment

This refers to the full utilization of the productive capacity available in society. Ensuring full employment has long been a fundamental goal for governments across various nations.

3. Optimal allocation of resources and income distribution

Fiscal policy aims to allocate resources efficiently, especially when those resources are scarce or limited in comparison to human wants, which are typically unlimited.

4. Achieving Stability in the General Price Level

Fiscal policy plays a significant role in stabilizing the general price level, particularly during periods of recession or economic boom. It does so by influencing employment levels, prices, and national income.

Second: Unemployment

Definition, Types, and Causes of Unemployment

The concept of unemployment is one of the most significant topics in contemporary societies in terms of research and analysis. As such, it has attracted considerable attention from economic and social researchers due to its persistent and pressing presence in the global arena. It is rare to find a specialized academic journal in the fields of economics or sociology that does not address the issue of unemployment through discussion and analysis.

Unemployment has been defined as the involuntary or, in some cases, voluntary cessation or interruption of work by a segment of the labor force, despite their ability and willingness to work and be productive. It is also described as a situation in which a person is unable to find employment that matches their skills and qualifications, primarily due to conditions in the labor market.

Based on the above, unemployment can be defined as a condition arising when a segment of the labor force is capable, qualified, and willing to work and produce, and actively seeking employment but unable to find a suitable job with appropriate compensation. In other words, it is an involuntary and compulsory cessation of work for individuals who are able to work typically those between the ages of 15 and 60 excluding the elderly, retirees, the disabled, homemakers not seeking employment, and students of all types. Unemployment is measured by dividing the number of unemployed individuals by the total working-age population, and this ratio is referred to as the unemployment rate.

As for its types, unemployment varies depending on circumstances and countries. The most common types include:

- Frictional unemployment.
- Structural unemployment.
- Involuntary (or compulsory) unemployment.
- Cyclical unemployment.
- (Mohammed, 2023, p. 203).
- Causes of Unemployment.

Table 1: Causes of Unemployment

Economic Causes of Unemployment	Social Causes of Unemployment	Political Causes of Unemployment
An increase in the number of job seekers compared to the limited availability of jobs	High population growth rates accompanied by widespread poverty	The spread of wars and civil crises within society
Resignation from a current job in search of new employment opportunities	Lack of attention to the education sector	The absence of political development's impact on the economic situation
Replacement of workers with technological tools such as computers	Absence of local community development	Decline in government support for the business sector
Hiring employees from outside the local community	A large number of able-bodied individuals experiencing a sense of despair	

Table Compiled by the researcher based on Issa *et al.*, 2018, pp. 147-149

Third: Fiscal Policy in Iraq (2004-2024)

Iraq's fiscal policy underwent significant transformations during the period from 2004 to 2024, influenced by economic and political changes. After 2003, public finances were almost entirely dependent on oil revenues, making the budget vulnerable to fluctuations in global oil prices. Over the two decades, government spending increased at an unprecedented rate to meet the demands of reconstruction and the salaries of an expanding public sector, while non-oil revenues remained limited.

6. Government Spending: Development, Distribution, and Priorities

Public spending in Iraq experienced significant inflation after 2003, as the state focused on rebuilding infrastructure, providing services, and increasing salaries for government employees. Government expenditure as a percentage of GDP was very high compared to other countries in the region. According to the World Bank (2023) ^[11], the average total government expenditure was about 52% of GDP during 2005-2012, a level significantly higher than the Middle East and North Africa region's average of 30% (World Bank, 2023) ^[11].

7. Budget Deficits: Levels, Causes, and Addressing Budget Gaps

Iraq's budget balance has fluctuated greatly between surpluses and deficits throughout the period, driven by oil price volatility. Despite achieving budget surpluses in years

with high oil prices (such as 2006, which saw a surplus of nearly 10.7% of GDP), the budget slipped into large deficits in other years when prices fell or emergency spending increased (International Monetary Fund, 2023) ^[10].

8. Taxes: The Tax System, Reforms, and Their Impact

Iraq's tax system relies on a limited set of taxes and fees, with tax contributions to financing the budget being minimal compared to oil revenues. Over the past period, non-oil revenue accounted for only 5-7% of total government revenues (International Monetary Fund, 2023) ^[10].

9. Public Debt: Debt levels, structure, and the impact of borrowing

Iraq's public debt has undergone significant developments over the past two decades. After 2003, Iraq inherited a massive debt burden from the previous regime (over \$120 billion in external debt). However, a large portion of this debt was addressed through the 2004 Paris Club agreement (World Bank, 2023) ^[11].

Third Section: Measuring and analyzing fiscal policy on unemployment rates in Iraq

Fourth: Model formulation and estimation methodology

This research reviews various econometric literature that we deemed appropriate for measuring the effect of financial variables on unemployment rates in Iraq from 2004 to 2023. We begin by determining the stationary of the time series,

which is typically done using the Augmented Dickey-Fuller test, as shown in the table below:

1. Indicators Used in Estimation

Table 1.1: Symbols and indicators of variables used in the research

Significance	Symbol	Description
Unemployment Rates	UNEM	Dependent Variable
Public Expenditures	EXPE	Independent Variable
Public Revenues	REV	Independent Variable
General Budget	DB	Independent Variable

The table is prepared by the researcher based on the variables used in the analysis: The research includes fiscal

policy variables along with unemployment. The dependent (or response) variable represents the unemployment rate, while the fiscal variables include (public revenues, public expenditures, and the general budget). The symbols used correspond to those found in the International Monetary Fund (IMF), as shown in the table below:

2. Stationarity of time series: This is a crucial step in time series analysis, focusing on studying the characteristics of data over time to determine whether the values are significantly dependent on time or if they are stable. A stationary time series is one where its statistical properties (such as mean and variance) remain constant over time, as shown in the following Table.

Table 2: Stationarity Test

Test and Variables	Augmented Dickey-Fuller		Phillips-Perron	
	At Level	1 st difference	Intercept	1 st difference
UNEM	-5.500363	---	-6.321084	---
	(0.0004) ^J	----	(0.0001)	---
EXPE	-2.165383	-5.924901	-5.766166	-----
	(0.172) ^{n.s}	(0.0002)	(0.0002)	-----
REV	-1.795948	-4.773186	-3.681940	---
	(0.1120) ^{n.s}	(0.0020)	(0.0143)	----
BD	-4.270831	-----	-4.270984	-----
	(0.0043)	-----	(0.0043)	-----

Notes: () () () ^(n.s) indicate significant at 10%, 5%, 1% and not significant respectively

Source: Prepared by the researcher using E-Views 10 software

Table 2 shows the results of the tests conducted using both the (Dickey-Fuller) and (Phillips-Perron) methods, which were performed at the level and first difference. The unit root tests confirm that the stationarity of the variables in the model varies at the level and first difference. The results of the stationarity test indicate that all variables (EXPE, BD, and UNEM) are stationary at the level, except for the variable (REV), which is not stationary at the level but

becomes stationary at the first difference at a 5% significance level.

1. Preliminary Estimation of the Model: The Impact of Financial Policy Variables on Unemployment Rates in Iraq: From the table, we observe the preliminary estimation of the model on the effect of financial policy variables on unemployment rates in Iraq for the period (2004-2023).

Table 3: Preliminary estimation results of the ARDL Model

ARDL Model Estimation Results	
Dependent Variable: UNEM	
Method: ARDL	
Selected Model: ARDL (1, 0)	
Statistic	Value
Mean dependent variable	13.16611
S.D. dependent variable	2.305156
S.E. of regression	1.821278
R-squared	0.522640
Adjusted R-squared	0.375760
Sum squared residuals	43.12167
Log likelihood	-33.40378
Akaike info criterion	4.267087
Schwarz criterion	4.514412
Hannan-Quinn criterion	4.301189
Durbin-Watson statistic	2.119011
F-statistic	3.558277
Prob(F-statistic)	0.035948

Source: Prepared by the researcher using E-Views 10 software

The table shows the relationship between unemployment rates as the dependent variable, while (revenues, expenditures, and government budget) are independent variables. The value of ($R^2 = 0.37$) represents the explanatory power of the model, and the value of (D.W=2.1) indicates the absence of autocorrelation in the error term of

the model. The F-test value of ($F=3.55$) reflects the statistical significance of the model at the 5% significance level. This indicates the identification of both short-and long-term equilibrium relationships according to the ARDL model after conducting the Bond test.

Bound Test

After the preliminary estimation, we proceed with the cointegration test to identify long-term relationships between the dependent variable and the explanatory variables, as shown in the following Table.

Table 4: Bound Test Results

Critical values	F. Statistic	
	13.75944	
	I(0)	I(1)
10%	4.04	4.78
5%	4.94	5.73
2.5%	5.77	6.68
1%	6.84	7.84

Source: Prepared by the researcher, based on the output of the statistical analysis program, E-Views 10.

The Bound Test (Bound-Test) is used to test the quality of the long-term equilibrium relationship between the variables in the standard model by relying on the F-TEST, in the presence of the Wald-Test. This tests the coefficients of the long-term equilibrium relationship in the model. As shown in Table (4) above, the statistical value (F) is (13.75944), which is greater than the highest critical value at the 5% significance level (5.73). This indicates the acceptance of the alternative hypothesis, suggesting that there is a long-term equilibrium relationship between the dependent and explanatory variables during the study period.

3. Estimation of the long-term relationship

To avoid linear correlations and estimate long-term relationships, we use the inverse of Hendry’s method, also known as the "general-to-specific" approach, which is an econometric methodology for building and estimating regression models. This approach, developed by David F. Hendry, starts with a comprehensive model that includes all potential explanatory variables and gradually simplifies it to retain only the significant variables while ensuring the model adheres to theoretical and statistical standards (Brooks, 2008, p. 192) [1].

Through the table, we can obtain the long-term parameters in the distributed lag model.

Table 5: Estimation of the long-term equilibrium relationship

ARDL Long run form and bounds test				
Dependent Variable: D(UNEM)				
Selected Model: ARDL(1, 0) for all variable				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
REV	0.004892	0.004028	-1.214581	0.0995
EXPE	-0.210229	0.117291	-1.792379	0.0709
BD	-0.171098	0.089336	1.915226	0.0490
C	12.39195	0.671559	18.45251	0.0000

Source: Prepared by the researcher, based on the output of the statistical analysis program, EViews 10.

- The estimation results for the long-term equilibrium relationship, as shown in Table 5 above, indicate a long-term response between the dependent variable (UNEM) and the explanatory variables (EXPE, REV, BD). The estimation results for the long-term relationship align with the assumption in the model that the parameters of the independent variables have a

significant effect on unemployment rates in Iraq (UNEM).

- The results indicate that the budget balance variable (BD) has a negative and statistically significant effect on unemployment rates. Specifically, a 1% change in (BD) leads to a decrease in unemployment rates by 0.17%. This means that an increase in the government budget balance reduces unemployment rates.

However, the other independent variables, such as government revenues and expenditures, do not have a statistically significant effect at the 5% level in the long term, meaning they do not affect unemployment.

4. Estimation of the Short-Term Relationship

Table (6) shows that all explanatory variables are statistically significant at the 5% level. The impact of (EXPE, REV, and BD) on the growth rate in the short term is positive and statistically significant at the 5% level or lower.

Table 6: Estimation of the Short-Term Equilibrium Relationship

ARDL Error Correction Regression				
ECM Regression Results				
Dependent Variable: D(UNEM)				
Selected Model: ARDL				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
D(UNEM(-1))	-0.241273	0.153249	-1.574381	0.1437
EXPE	-0.098210	0.016333	-6.012979	0.0055
CointEq(-1)	-0.771367	0.166522	-4.632233	0.0007

Model Summary

Statistic	Value	Statistic	Value
R-squared	0.614937	Mean dependent var	-0.377647
Adjusted R-squared	0.559928	S.D. dependent var	2.408229
S.E. of regression	1.597569	Akaike info criterion	3.933629
Sum squared residuals	35.73120	Schwarz criterion	4.080667
Log likelihood	-30.43585	Hannan-Quinn criterion	3.948245
Durbin-Watson stat	2.059152		

Source: Prepared by the researcher, based on the output of the statistical analysis program, E-Views 10

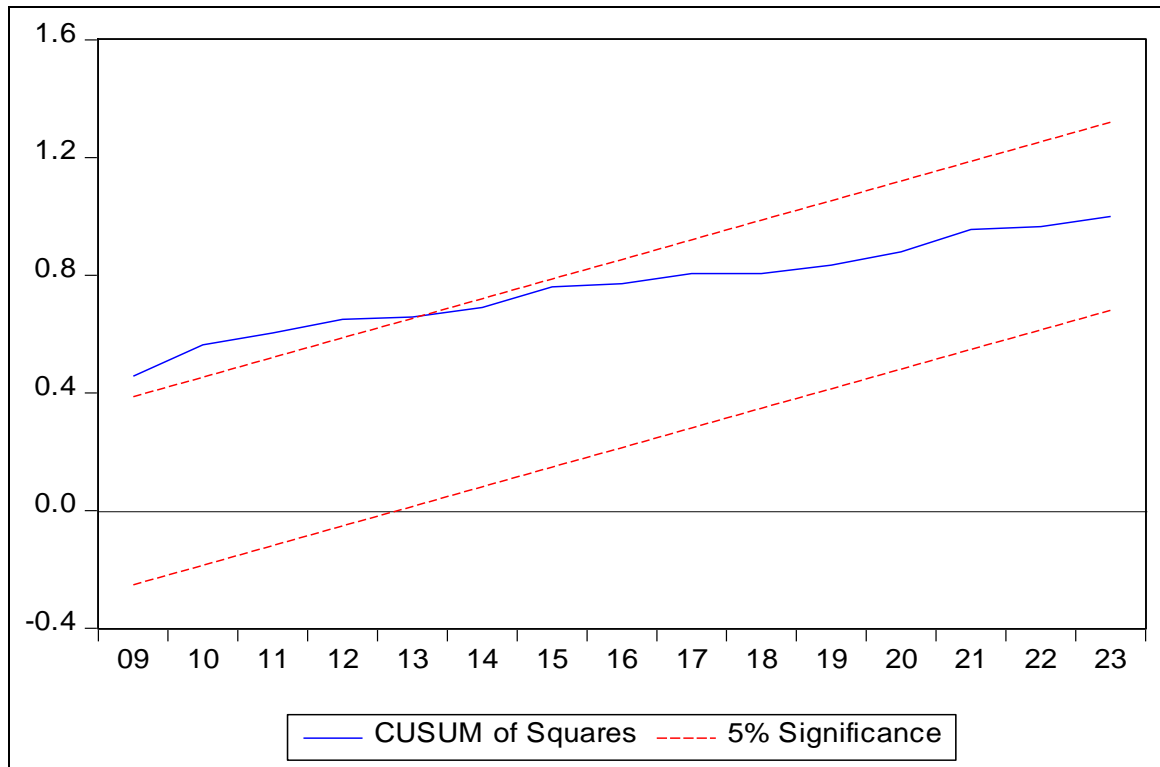
According to the results of the Error Correction Model, the error correction coefficient is (0.77). Since the absolute value is less than one, it indicates that the return to equilibrium requires short periods (one year and one month). It can be said that the change pattern in the model has rapid responses to adjust and correct the deviation. The relationships can be interpreted as follows:

- The results indicate that the variable (EXPE) has a negative and statistically significant effect on unemployment rates. Specifically, a 1% change in (EXPE) leads to a decrease in unemployment rates by 0.09%.
- However, the other independent variables (REV, BD) have no statistically significant effect as a combination of fiscal policy in the short term on unemployment rates in Iraq.

5. Structural stability tests for the estimated models

The cumulative sum control chart (CUSUM) test is used to ensure the absence of any structural changes in the data. The critical level at 5% confirms the stability of the variables. Figure 1 shows the long-term and short-term stable parameters of the model, indicating consistency among the observed variables as they fall within the confidence limits

during the study period. The graph shows that the total CUSUM control chart for the residuals of this pattern is an average line within the critical region limits, indicating the stability of the model at a 5% level. Furthermore, the cumulative sum of the squared residuals (CUSUM of Squares) also represents an average line within the critical region limits.



Source: Prepared by the researcher, based on the output of the statistical analysis program, E-Views 10

Fig 1: CUSUM of squares residuals test graph

6. Diagnostic Tests

Autocorrelation

The first step of the diagnostic tests is to check for serial correlation between the values of the random variable. For this, the Breusch-Godfrey test was used to test the null hypothesis, which states that there is no autocorrelation of the errors. Table 7 shows that the Lagrange Multiplier (LM) value is less than 2, and the p-values are not significant at the 5% level, indicating the absence of autocorrelation between the values of the random variable.

Table 7: Breusch-Godfrey LaGrange multiplier test for autocorrelation

Breusch-Godfrey Serial Correlation LM Test			
Null hypothesis: No serial correlation at up to 1 lag			
F-Statistic	0.394333	Prob. F(1,10)	0.394333
ObsR-squared	0.644933	Prob. Chi-Square(1)	0.644933

Source: Prepared by the researcher, based on the output of the statistical analysis program, E-Views 10.

Heteroscedasticity

There are several tests to detect whether the residuals in the model are Heteroscedasticity or not, among which is the

ARCH test. It was found that the model does not suffer from Heteroscedasticity, as the LM value is less than 2, and the p-values are not significant at the 5% level, indicating homoscedasticity of the estimated residuals.

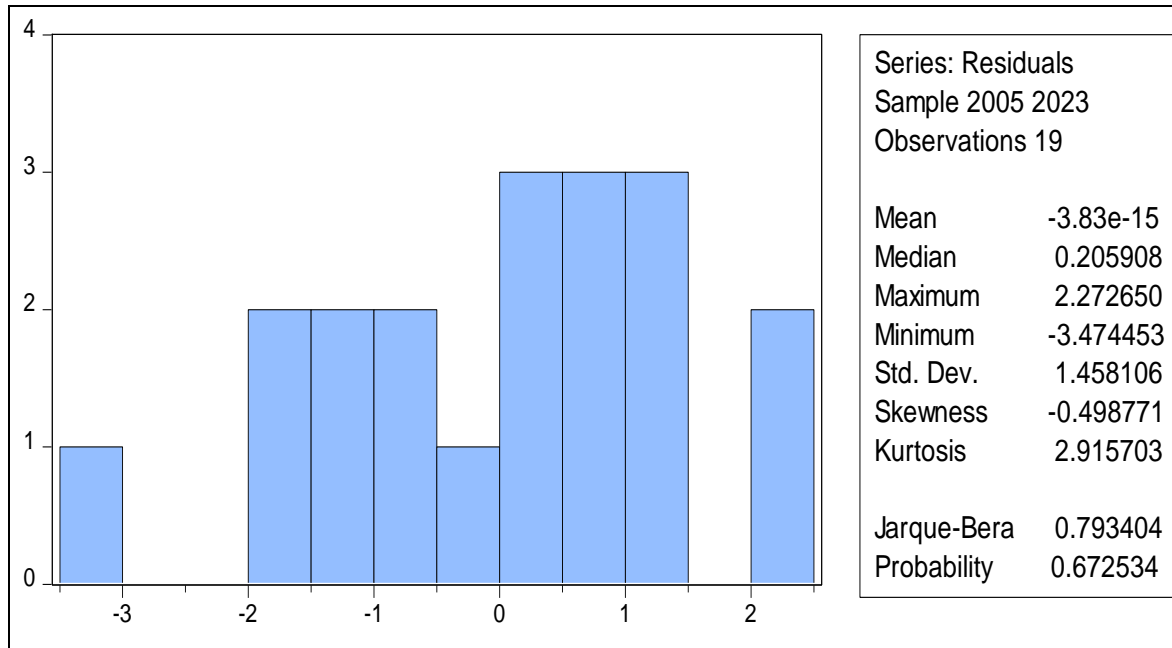
Table 8: Heteroscedasticity Test (ARCH)

Heteroscedasticity Test :ARCH			
F-statistic	0.415570	Prob. F(1,14)	0.5296
ObsR-squared	0.461245	Prob. Chi-Square(1)	0.4970

Source: Prepared by the researcher, based on the output of the statistical analysis program, E-Views 10.

Normality Distribution Problem

One of the basic assumptions upon which the construction and estimation of econometric models is based is the normal distribution of the errors or residuals of the model. There are several tests in this area, with the most commonly used being the Jarque-Bera test. The null hypothesis of this test states that the residuals follow a normal distribution, while the alternative hypothesis indicates otherwise. The following graph presents the histogram of the residuals, along with some related measures:



Source: Prepared by the researcher, based on the output of the EViews-10 software

Fig 2: Normality Distribution Test

The figure above shows that the p-value for the Jarque-Bera test is (0.608), which is greater than the significance level (5%), indicating that the test is not statistically significant. Therefore, the null hypothesis is accepted.

Conclusions and Recommendations

First: Conclusions

Fiscal policy is a tool used by the government to influence the economy through government revenues (such as taxes) and government spending, such as spending on projects and public services. However, the government budget is the most representative of clear fiscal policy, encompassing income and expenditures for everyone, and reflects how the government influences the economy through expenditure and financing tools to achieve effective goals. Therefore, government policies, in general, are those that define fiscal policies in a more comprehensive manner, including all the requirements that influence unemployment rates. The most important conclusions are as follows:

- **Budget Balance:** The budget balance, which represents fiscal policy in Iraq, affects unemployment rates in the long term. In the case of a budget surplus, the state will exert efforts to reduce unemployment rates by hiring new graduates or encouraging private sector projects due to favorable economic conditions. The Iraqi government typically uses the budget surplus to invest in infrastructure, education, and innovation, which enhances productivity and economic growth, contributing to the creation of sustainable jobs.
- **Government Expenditures:** Government expenditures affect unemployment rates in the short term by stimulating aggregate demand through increasing the incomes of individuals working in the public sector. This leads to higher consumption and investment, encouraging businesses to expand and hire more employees. Additionally, spending on public projects (such as infrastructure, healthcare, and education) increases demand for labor in targeted sectors, creating new job opportunities and reducing unemployment.

- **Challenges with Public Sector Dependency:** Despite extensive efforts, reliance on the public sector still constitutes a larger portion than the private sector, which hinders growth rates and affects unemployment levels in Iraq.

Second: Recommendations

- **Focus on Sustainable Government Spending:** Policymakers should focus on sustainable government spending that is not funded by debt, as excessive borrowing leads to increased taxes or inflation, which could negatively affect employment and job creation in the long term.
- **Adopt a Balanced and Sustainable Fiscal Policy:** A balanced and sustainable fiscal policy provides more stability to the economy, boosts investor confidence, and strengthens long-term employment.
- **Diversify Income Sources and Encourage the Private Sector:** It is important to diversify income sources, encourage the private sector, and combat corruption to promote economic growth and ultimately eliminate unemployment.

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