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***Research paper***

# Measuring The Effect of Issued Currency on Economic Growth Under The Exchange Rate Volatility of The Iraqi Dinar During The Period (2020–2024)

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**Abstract**

This research aims to analyze and measure the impact of currency issuance on the Gross Domestic Product (GDP) at current prices in Iraq, under the fluctuations of the parallel exchange rate during the period (2004–2024). The study is based on the hypothesis that monetary policy, represented by money issuance, directly and indirectly affects economic growth. However, this relationship may be influenced by structural variables and economic shocks that Iraq experienced throughout the study period. The research employs unit root tests with structural breaks to determine the stationarity and cointegration properties of the variables. The results indicate that GDP and the exchange rate are integrated of order one( I (1)), while the issued currency is stationary at the level. Relying on the regression approach with the inclusion of structural changes using the Indicator Saturation Methods (SIS), the findings reveal a positive and statistically significant relationship between issued currency and economic growth, reflecting the role of expansionary monetary policy in supporting economic activity. Conversely, the parallel exchange rate was found to have no significant direct effect on growth, due to the Central Bank's intervention in stabilizing the dinar through the currency auction. The study concludes that issued currency represents the most influential variable on economic growth in Iraq, whereas the impact of exchange rate volatility remains limited, reflecting the rentier nature of the Iraqi economy and its near-total dependence on oil revenues.

***Keywords***: *Issued Currency; Parallel Exchange Rate; Economic Growth; Indicator Saturation Methods (SIS).*

## 1. Introduction

Monetary policy is one of the fundamental tools for managing the macroeconomy, and currency issuance constitutes one of its most important components, given its direct impact on the money supply, liquidity levels, investment and consumption activities, and consequently on economic growth rates. This role becomes even more significant in rentier, single-resource economies, such as the Iraqi economy, which heavily relies on oil revenues to finance public spending and cover imports. During the period 2004–2024, Iraq experienced a turbulent monetary environment due to sharp fluctuations in the exchange rate of the Iraqi dinar against the US dollar, influenced by oil price shocks, political and security instability, and changes in the Central Bank's foreign reserve management policies. When we talk about changes in currency value, it's not just about price stability. In fact, these changes significantly influence how the effect of money printing is transmitted to the national economy. Sometimes, this process can help stimulate economic growth, but other times, it can hinder it. It all depends on what happens to the purchasing power of the local currency.

We've observed through some economic studies that increasing the amount of money in circulation can contribute to stimulating the economy. This usually happens by providing greater liquidity and facilitating access to loans. However, other economic experiments point to different outcomes. In some cases, this increase in the money supply is accompanied by rising prices and a depreciation of the currency, reducing its effectiveness in supporting growth. This situation has been more sophisticated, since the exchange rate is considered the main parameter included within the equation. Exchange rate fluctuations play an important role, as they can enhance or weaken the impact of currency issuance on the economy. This makes the relationship between variables more complex. For this reason, this study focuses on the case of Iraq. We attempt to better understand the relationship between money printing and economic growth.

We seek to analyze data from 2004 to 2024 to understand this complex relationship. The study also aims to examine the links between these variables in the short and long term. It also explores how exchange rate fluctuations affect this relationship. Ultimately, we hope this study will provide practical recommendations based on clear quantitative evidence that can help monetary policymakers make more informed decisions.

## 2. Literature Review

Recently, in Iraq, the internal and external parameters influence the importance of monetary policy, and the complexities have been studied by many researchers to better understand the interconnected mutual characteristics among money supply, variation of exchange rate and finally economic growth. Relating these studies has made a major contribution to tendencies in the money supply chain provided by the Gross Domestic Product (GDP) within the years from 2004 to 2018, as indicated by Sabah et al. (2020). The author used to identify the M1 and M2 main factors with respect to discrepancy within the GDP employing analytical and descriptive solutions based on the influences of both exchange rate and monetary policy as a possible method to describe the correlation of money supply across the GDP. Nevertheless, the author pointed out that the various monetary accumulation exchange rates have been affected by this correlation after a specified age. On the other hand, a step toward studying the instability in the Iraqi economy influenced by the exchange rate, focusing especially on characteristics of money supply during 2004 to 2020, has been confirmed by the study of Al-Shukri (2022), which proposed monetary policies usage to lower the exchange rate instability as a function of time-series econometric models to improve monetary interventions. Since the facts are well since the exchange rate will lower the income of the money source by means of growth simulation because of highly risky matter indicators that lie on both local and foreign investment. In line with this study, Al- Tamimi (2022) tries to investigate the and evaluate the money supply via experimental study on economic growth in Iraq between 2003 and 2020, using the Autoregressive Distributed Lag (ARDL) model on economic growth in Iraq between 2003 and 2020, using the Autoregressive Distributed Lag (ARDL) model. Hence, the inclusion of cointegration within the variables presents an upward trend to money supply, which in turn mimics short-term growth and secondly influences the inflation and exchange rates as described by long-term facts. Extending the real confirmation on the significance of money supply for coordination related to multiple economic policies, monetary policy growth. For such a study that compares M1 and M2 indicators based on monetary parameters and the real GDP as the dependent variable. advancing to this study, which will be confirmed by Mous and Maznan (2024) as they review the period between 2007 reaching 2022 with the aid of multiple regression analysis to train the two kinds of parameters, namely: short and long terms to analysis the Iraqi economic growth based on policy monetary. The study would significantly promote the real GDP as intended by the M2 parameter within long-term facts, besides, exchange rate would affect growth variables signifying it properties due to foreign trade and import cost when tracking the short term one. In conclusion, the real impact of exchange rate constancy requirements issues is to improve the monetary policy indicators. Highlighted on the Iraqi back-ground, many recent global topics have comprised a highly accepted comparison baseline, for instance, the monetary growth has positively reflected the influence of the exchange rate, as studied by Adegbite and Onanuga in Nigeria during 2024. Considering the quantile ARDL method as a reference for employing the increasing rate of money and its consequences on monetary policy. alternatively, the same study done in Nigeria presents a major exchange rate management which is crucial for satisfying growth below instable monetary situations as the monetary policy contributed as the main assessment indicator that was clearly done by Adenigbagbe et al. (2024).

The implications presented above with these studies would raise some issues relating to the gap in knowledge needed. Of these implications, the facts beyond finding the economic growth with respect to currency situations have been raised as the regression models' major issues. Besides, the diminished role and variation within the exchange rate during evaluation, and this will be prohibited in accurate ways that lie in monetary policy, when considering the oil economies as a case study for a region such as Iraq. There is a clear need for a carefully designed empirical model that considers both structural breaks and fluctuations in exchange rates to produce findings that are both reliable and relevant for policy-making. This study is particularly important because it provides Iraqi monetary and financial authorities with accurate quantitative measures that can guide the development of monetary policies aimed at fostering economic growth while maintaining currency stability. By filling the identified research gaps, the study seeks to enhance understanding of how currency issuance interacts with exchange rate movements to affect economic growth in Iraq.

## 3. Research Methodology

This study focuses on a basic hypothesis that monetary policy, particularly about currency issuance, directly and indirectly affects economic growth in Iraq. Various structural factors and economic shocks affected the country during the study period. To test this hypothesis, the study will adopt a quantitative approach, through which we will attempt to measure the actual effects of currency issuance on economic growth with tangible figures and data, considering the fluctuations in the dinar exchange rate during the study period. The descriptive approach is also used to explain the theoretical framework, clarify basic concepts, and analyze the evolution of monetary and economic policies over the years. Through this study, we also sought to provide a comprehensive understanding of how monetary policy impacts overall economic performance. It is not just about numbers and theories; it has real-world impacts on people's lives and the country's development trajectory.

## 4. Research Results

To achieve this, the study is divided as follows:

### 4.1. Theoretical framework of the relationship between issued currency, economic growth, and exchange rate

1) Conceptual Basis of Issued Currency and Its Role in the Economy

Narrow money supply, or money in circulation, includes the banknotes in circulation and the coins we use for simple purchases. Another important component is demand deposits in commercial banks (M1). This money supply constitutes one of the key variables controlled by the monetary authority through monetary policy tools, thus influencing overall economic activity. (Mishkin, 2019, p. 412).

From the perspective of the Quantity Theory of Money, the relationship between the money supply and GDP is based on the exchange equation MV = PQ, where money supply (M) represents a key determinant of real output (Q) and the general price level (P) under a given velocity of circulation (V) (Friedman, 1968, p. 8). This theoretical formulation indicates that any change in the money supply, if not accompanied by a change in the velocity of money or productive efficiency, will often lead to a change in prices rather than a significant effect on real output.

The monetary approach posits that an increase in the money supply can act as a driver of economic growth if the economy operates below its full productive capacity, as this monetary expansion boosts aggregate demand, thereby increasing investment and consumption levels

(Dornbusch & Fischer, 2014, p. 212). However, when the economy reaches full capacity, any monetary increase translates primarily into inflationary pressure without a real effect on growth.

2) Theoretical Relationship between Issued Currency and Economic Growth

It can be stated that economic growth, defined as the sustainable increase in real GDP, is influenced by a set of real and monetary factors. The monetary school places the money supply at the center of these factors, arguing that effective management of the monetary aggregate serves as a tool to guide the economy toward stability and growth (Friedman, 1968, p. 9). According to the IS–LM framework, the money supply is the primary determinant of the interest rate level, which in turn affects investment and subsequently output. In a closed economy, this effect is relatively direct, whereas in an open economy, other variables, most importantly the exchange rate, interact, complicating the relationship between money supply and growth (Krugman & Obstfeld, 2018, p. 317).

3) Conceptual Basis of Exchange Rate and Its Role in the Economy

The exchange rate reflects the relative strength of the domestic currency against foreign currencies, determined either by market forces under flexible regimes or through official or managed fixation in fixed regimes (Mundell, 1963, p. 476). This variable plays a dual role in the economy by affecting international competitiveness through export and import prices and influencing the general price level via the imported inflation channel. Economic theory distinguishes between the nominal and real exchange rates, with the latter representing the relative purchasing power of the currency adjusted for inflation differentials, and it is more closely associated with economic growth (Rodrik, 2008, p. 366).

4) Exchange Rate Channel as a Mediator between Issued Currency and Growth

In the Mundell–Fleming model for an open economy, an expansion in the money supply under a flexible exchange rate reduces domestic interest rates, encouraging capital outflows, which pressure the domestic currency to depreciate (Mundell, 1963, p. 478). This depreciation improves export competitiveness and stimulates growth, particularly in countries with an export-oriented production base (Rodrik, 2008, p. 370). However, this channel is not unidirectional; high exchange rate volatility can undermine confidence in the domestic currency and increase uncertainty, thereby reducing the responsiveness of private investment to monetary expansion and ultimately affecting growth (Aghion et al., 2009, p. 571).

5) The Triangular Relationship: An Integrated Theoretical Framework

Recent literature integrates the three variables in a dynamic framework, highlighting that:

- Issued currency represents the primary monetary policy instrument for influencing aggregate demand.
- The exchange rate constitutes a key transmission channel of this effect in open economies, capable of amplifying or weakening the impact of monetary expansion.
- Economic growth is the outcome of these interactions, yet it is also influenced by external conditions such as international trade and financial market volatility.

Accordingly, the exchange rate can be considered a moderating variablein the relationship between issued currency and economic growth, whereby the magnitude and effect of monetary expansion depend on exchange rate stability or volatility (Al-Shukri, 2022, p. 145).

## 4.2. Analysis of the effect of issued currency on economic growth under the exchange rate volatility of the Iraqi dinar during the period (2004–2024)

Table (1) illustrates the trends of the relationship between issued currency and economic growth under the exchange rate volatility of the Iraqi Dinar during the period (2004–2024).

**Table 1:** The Relationship between Issued Currency and Economic Growth under the Exchange Rate Volatility of the Iraqi Dinar during the Period (2004–2024)

| Years | Issued Currency (Trillion IQD | Parallel Exchange Rate (IQD per USD) | GDP at Current Prices (Trillion IQD) |
|---|---|---|---|
| 2004 | 8,020,524 | 1453 | 53,235,359 |
| 2005 | 10,256,512 | 1472 | 73,533,599 |
| 2006 | 11,916,555 | 1475 | 95,587,955 |
| 2007 | 15,632,225 | 1266 | 111,455,813 |
| 2008 | 21,304,418 | 1203 | 157,026,062 |
| 2009 | 24,169,401 | 1182 | 130,643,200 |
| 2010 | 27,507,328 | 1185 | 162,064,566 |
| 2011 | 32,157,444 | 1196 | 217,327,107 |
| 2012 | 35,784,805 | 1233 | 254,225,491 |
| 2013 | 40,630,036 | 1232 | 273,587,529 |
| 2014 | 39,883,686 | 1214 | 266,332,655 |
| 2015 | 38,585,119 | 1247 | 194,680,972 |
| 2016 | 45,231,515 | 1275 | 196,924,142 |
| 2017 | 44,236,654 | 1258 | 221,665,710 |
| 2018 | 44,264,484 | 1195 | 268,918,874 |
| 2019 | 51,834,750 | 1201 | 276,157,868 |
| 2020 | 66,031,234 | 1351 | 215,661,517 |
| 2021 | 76,561,599 | 1480 | 304,053,321 |
| 2022 | 87,561,568 | 1512 | 416,689,737 |
| 2023 | 101,481,022 | 1548 | 353,780,244 |
| 2024 | 100,543,204 | 1469 | 363,533,635 |

References:

1) Central Bank of Iraq. Statistics and Reports, Annual Bulletins (2004–2024).
2) Central Statistical Organization. Annual Reports on the US Dollar Exchange Rate (2004–2024).

It can be observed from the data in Table (1) that, from 2004 to 2013, the Iraqi economy experienced a phase of relative monetary stability, during which the Central Bank of Iraq adopted a quasi-fixed exchange rate policy through the currency auction mechanism. This policy ensured the provision of US dollars against the Iraqi Dinar at relatively stable rates, helping absorb any inflationary pressures arising from the increase in money supply (Central Bank of Iraq, 2024, p. 15). During this period, issued currency rose from 8.02 trillion IQD to 33.7 trillion IQD, while nominal GDP grew from 53.2 trillion IQD to over 218 trillion IQD (Central Bank of Iraq, 2024, p. 42). According to Keynesian theory, this increase in money supply, in the presence of underutilized productive capacity, contributed to stimulating aggregate

demand and thus supported real growth (Mankiw, 2020, p. 313). Furthermore, exchange rate stability prevented the transmission of liquidity increases to price levels, allowing it to be directed toward productive and consumptive economic activities.

However, the period 2014–2017 witnessed a sharp shift in the dynamics between the three variables due to external and security shocks. The ISIS crisis and the decline in global oil prices reduced dollar revenues, weakening the Central Bank's ability to meet dollar demand (IMF, 2016, p. 27). Consequently, issued currency increased to 43.1 trillion IQD in 2017, but nominal GDP contracted in 2015 before gradually recovering (Central Bank of Iraq, 2024, p. 46). Meanwhile, the gap widened between the official rate (1,182 IQD per USD) and the parallel rate, which exceeded 1,300 IQD per USD, leading to imported inflation due to higher import costs. From a monetary perspective, an increase in money supply in an environment of weak domestic production and high import prices generates inflationary pressures rather than real growth, which indeed occurred (Friedman, 1968, p. 8).

In the third phase (2018–2020), the official exchange rate stabilized at 1,182 IQD per USD, while the parallel rate remained relatively close until the onset of the COVID-19 pandemic. During this period, issued currency rose to 54.9 trillion IQD in 2020 due to monetary expansion aimed at supporting the economy amid global contraction and the collapse of oil prices (Central Bank of Iraq, 2024, p. 52). However, this liquidity did not translate into real growth due to weak external demand and domestic production constraints. At the end of 2020, the Central Bank increased the official exchange rate to 1,450 IQD per USD, a 22% devaluation to boost government revenues from dollar sales (IMF, 2021, p. 14). This decision, however, led to direct inflationary transmission through imported prices, significantly increasing the cost of imported goods, which reduced purchasing power and weakened the effect of expansionary monetary policy on growth.

The last period (2021–2024) was characterized by a sharp increase in issued currency to about 100.5 trillion IQD, and nominal GDP rose to approximately 363.5 trillion IQD (Central Bank of Iraq, 2024, p. 60). Yet, much of this increase reflected inflation caused by parallel exchange rate volatility, which in some periods exceeded 1,500 IQD per USD (World Bank, 2024, p. 21). According to the analysis within the Mundell-Fleming open-economy model, an increase in money supply in an import-dependent economy, coupled with insufficient foreign reserves to maintain exchange rate stability, results in mounting pressure on the domestic currency, enhancing inflation and weakening real growth (Krugman & Obstfeld, 2018, p. 592). This scenario illustrates the shift of the expansionary monetary policy effect from the aggregate demand channel to the price channel, making the relationship between issued currency and economic growth unstable and, at times, inversely affecting real growth.

Overall, the interaction between issued currency, nominal GDP, and the parallel exchange rate in Iraq during 2004–2024 followed two distinct paths. The first path was positive under monetary stability and adequate dollar supply, where liquidity stimulated production and consumption. The second path was inflationary during economic shocks and exchange rate volatility, where the effect of liquidity on growth was eroded due to the Dinar's depreciation and higher import costs.

## 4.3. Measuring the effect of issued currency on economic growth under the exchange rate volatility of the Iraqi dinar during the period (2004–2024)

The money supply, particularly issued currency, represents one of the most important monetary tools employed by the Central Bank to influence economic activity. An increase in issued currency reflects an expansionary monetary policy stance, providing greater liquidity to the economy and stimulating consumption and investment. Sometimes, the correlation between these factors isn't as simple as one might think. There's something else at play, such as changes in foreign exchange rates. This is something that changes the correlation between economic indicators.

Three primary sources were identified: the export currency (CI), the current gross domestic product (GDP), and the parallel exchange rate (EX), from data provided by the National Credit Corporation, the Central Bank of Iraq (CBI), and the Central Statistical Organization (CSO). It should be noted that, based on this information from the CBI and the CSO, some gaps exist, despite being subject to monthly reviews. These key findings are likely relevant and appropriate for Iraq.

### 4.3.1. The unified root testing result and its relation to the structural breaks

Considering the testing methodology adopted within this manuscript were utilized to specify the structural breaks based on unit root tests which aligned with the former one. This methodology will guarantee all the standalone parameters and help to introduce the order of each integration. Meanwhile, bearing in mind the probable structural breaks that may affect the time series performance, would be appended based on the Augmented Dickey-Fuller (ADF) theory. These facts would also support by idea behind the rationale facts of the Schwarz Criterion (SC) that was implemented to verify the optimum lag length as well as attracting more consistency to the major statistical results. It should also be noted that, within this manuscript, the author quantifies Saturation of Indicators (SIS) as a technique and provides significant economic measures. This technique would be attributed to helping to find the updated and recent news, for instance, global oil market price fluctuations. These facts can accumulate to serve the variation within different relations during the economic investments. However, dealing with these facts would tend to present a more ideal and sample model form and provide a better understanding of every reader who intends to intervene with the technology.

The results of the test (summarized in Table 2) indicate the stationarity properties for each of the study variables.

**Table 2:** Summary of Unit Root Test Results with Structural Breaks for the Study Variables

| Unit Root with Break Point Test (ADF) | | | | |
|---|---|---|---|---|
| At Level | | | | |
| | | CI | GDP | EX |
| | t-Statistic | -6.506754 | -4.236073 | -4.569907 |
| Trend and intercept | Prob | < 0.01 | 0.2385 | 0.1106 |
| | Break Date | 2016 | 2016 | 2019 |
| At First Difference | | | | |
| | | D(CI) | D(GDP) | D(EX) |
| | t-Statistic | | -6.251138 | -4.859812 |
| Trend and intercept | Prob | | < 0.01 | < 0.05 |
| | Break Date | | 2013 | 2023 |

Reference: Prepared by the authors using Eviews 13.

The results of Table 2, based on the Augmented Dickey-Fuller (ADF) test and accounting for potential structural breaks in the time series, indicate that the variables GDP at current prices (GDP) and parallel exchange rate (EX) do not satisfy the stationarity condition at the level,

meaning they contain a unit root. However, both variables became stationary after first differencing, with specific dates recorded for the occurrence of structural breaks in each series, indicating that they are integrated of order one (I(1)). In contrast, the issued currency (CI) variable exhibited stationarity at the level, i.e., I(0).

Methodologically, these results necessitate the use of a regression model that incorporates structural change effects, as ignoring these breaks could lead to biased or incorrect estimates of the economic relationships between variables. The fluctuations experienced by the Iraqi economy during the period 2004–2024, whether due to external shocks or internal factors such as exchange rate volatility, highlight the importance of including structural breaks in the model to ensure a more realistic and accurate interpretation of the relationship between issued currency, exchange rate, and economic growth.

### 4.3.2. Estimation of the study model using regression with structural changes

After testing the stationarity of the time series while allowing for structural breaks in the study variables, the next step was to estimate the regression model for economic growth in Iraq, taking into account potential structural changes. To achieve this, the Indicator Saturation Methods (ISM) were employed, specifically the Step Indicator Saturation (SIS) technique, to detect location shifts—that is, changes in the unconditional mean—which are treated as structural breaks to be incorporated into the model after estimation.

The estimation process was conducted using the Automatic Model Selection algorithm within Eviews 13, which enabled the systematic and precise integration of the detected indicators into the model structure. Upon completing the estimation, the results presented in the following table reflect the impact of the study variables while accounting for structural changes.

**Table 3:** Estimation Results of the Study Model Using Regression with Structural Changes

| | | | | |
|---|---|---|---|---|
| Dependent Variable: GDP | | | | |
| Method: Least Squares | | | | |
| Date: 08/19/25 Time: 06:43 | | | | |
| Sample: 2004 2024 | | | | |
| Included observations: 21 | | | | |
| Indicator Saturation: SIS, 20 indicators searched over 2 blocks | | | | |
| 10 SIS variables detected | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| CI | 7.189183 | 0.599732 | 11.98733 | 0.0000 |
| EX | 84991.35 | 59122.95 | 1.437536 | 0.1885 |
| C | -1.21E+08 | 87531445 | -1.376851 | 0.2059 |
| @AFTER("2015") | -68180925 | 16895900 | -4.035353 | 0.0038 |
| @AFTER("2016") | -47918744 | 21439725 | -2.235045 | 0.0559 |
| @AFTER("2017") | 33338659 | 20815691 | 1.601612 | 0.1479 |
| @AFTER("2018") | 52407544 | 21090191 | 2.484925 | 0.0378 |
| @AFTER("2019") | -47694980 | 21311964 | -2.237944 | 0.0556 |
| @AFTER("2020") | -1.75E+08 | 26396348 | -6.641304 | 0.0002 |
| @AFTER("2021") | 1723201. | 24539397 | 0.070222 | 0.9457 |
| @AFTER("2022") | 30835905 | 22294886 | 1.383093 | 0.2040 |
| @AFTER("2023") | -1.66E+08 | 23069566 | -7.197304 | 0.0001 |
| @AFTER("2024") | 23209853 | 21380738 | 1.085550 | 0.3093 |
| | | | | |
| R-squared | 0.990879 | Mean dependent var | | 2.19E+08 |
| Adjusted R-squared | 0.977196 | S.D. dependent var | | 97214099 |
| S.E. of regression | 14680200 | Akaike info criterion | | 36.11491 |
| Sum squared resid | 1.72E+15 | Schwarz criterion | | 36.76152 |
| Log likelihood | -366.2066 | Hannan-Quinn criterion. | | 36.25524 |
| F-statistic | 72.42087 | Durbin-Watson stat | | 1.792713 |
| Prob(F-statistic) | 0.000001 | | | |

Reference: Prepared by the authors using Eviews 13.

Figure (1): Distribution of Residuals for the Estimated Model Measuring the Effect of Issued Currency on Economic Growth under the Iraqi Dinar Exchange Rate Volatility during the Period (2020–2024)

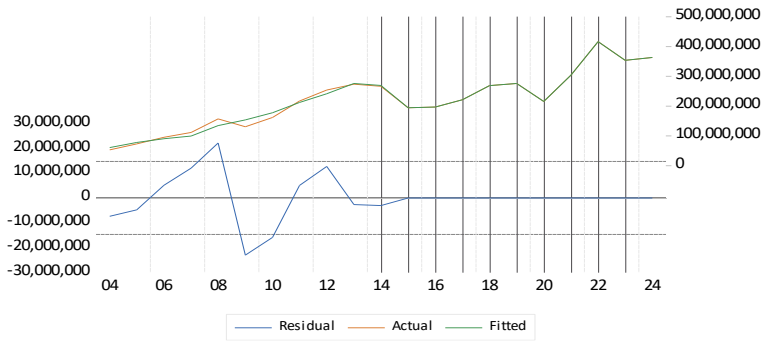


**Figure (1):** Residuals distribution for the estimated model

Reference: Prepared by the authors using Eviews 13.

Based on the estimation results presented in Table 3, the following observations can be made:

1) Significance of the Regression Equation: Regarding the significance test of the regression equation, the calculated F-statistic was F = 72.42087, which is highly significant at any conventional level of significance, as confirmed by the P-Value = 0.000001. This allows us to reject the null hypothesis and accept the alternative hypothesis, which states that at least one of the regression coefficients is

statistically different from zero. Consequently, the regression equation as a whole is significant in explaining the behavior of the dependent variable (economic growth).

2) Contribution of Explanatory Variables: Regarding the contribution of the explanatory variables (issued currency and parallel exchange rate) in explaining the behavior of the dependent variable (economic growth), the Adjusted R-squared value is 0.97, indicating that 97% of the variations in the dependent variable are explained by the explanatory variables, while the remaining 3% are attributed to unobservable factors or estimation errors.
3) Durbin-Watson Statistic: The Durbin-Watson statistic was 1.792713, which is close to 2, indicating that the null hypothesis of no autocorrelation in the residuals cannot be rejected. This confirms the absence of significant autocorrelation issues in the model.
4) Effect of Issued Currency: The results in Table (3) reveal a strong and statistically significant positive relationship between GDP at current prices and issued currency (CI), with a t-statistic = 11.98733 and P-Value = 0.0000. This indicates that the expansion of the money supply through an increase in issued currency had a direct impact on stimulating economic activity during the period 2004–2024. This correlation reflects the central role of expansionary monetary policy in Iraq, as the government relied on increasing the money supply to finance both current and investment expenditures, particularly given the dominance of oil revenues in the state budget. Consequently, the liquidity expansion supported aggregate demand; however, it was primarily associated with government spending rather than real productive activity, rendering economic growth sensitive to fluctuations in oil prices.
5) Effect of Parallel Exchange Rate: The relationship between economic growth and the parallel exchange rate appears positive but statistically insignificant, with a P-Value = 0.1885 and t-statistic = -1.437536. This indicates that fluctuations in the exchange rate did not have a decisive effect on the level of GDP at current prices. This outcome is attributed to the intervention of the Central Bank of Iraq through the foreign currency auction to maintain a relative stability of the dinar against the US dollar, which limited the transmission of exchange rate shocks to the real economy. Moreover, the rentier nature of the Iraqi economy, heavily reliant on oil revenues, made GDP more sensitive to global oil price changes than to domestic monetary fluctuations.
6) Effect of Incorporating Structural Changes: The results of incorporating structural changes into the estimated model indicate a highly statistically significant effect, with a P-Value = 0.0000. This major concern will reflect on the Iraqi region, suggesting that from 2004 to 2024 will most likely depend on accounting for potential economic shocks and troubles experienced, which finally exposed a robust economic growth that is served by two parameters and their relation. The first one is the growth rate of issued currency, and the second one is the parallel exchange rate.

Dealing with these parameters must open for more discussion, since the relation among parallel exchange rate fluctuations and monetary expansion would sustain more currency issued that do not work separately as one for the other; relatively, their characteristics came together to shape the course of economic growth. Reaching back to the Iraqi background issue, taking the oil funds as a major concern based on foreign prevalence exterior shocks like global oil price variations or political and security procedures that put a huge defect on the exchange rate, perhaps this can directly impose the policy of monetary and increase the volume of allocated currency.

In line with this discussion, the consistency of global market exchange would accordingly affect the economic growth in terms of the issued currency. Supporting these facts can also extend to utilizing the structural changes as a basic concern that can intervene in the model, which is presented by the main events. Taking the global oil crisis that happened due to climate, war, foreign policies as an example and as a reference comparison point beside other related parameters like monetary policy or other facts including catastrophes security situation and political world change, that come in heavily weighted facts to bring the major role in restructuring the different relationships with these parameters, Issued currency may enhance growth during stable periods, but it can turn into a source of inflationary pressures and exchange rate deterioration during crises, thereby weakening its positive impact on GDP.

#### 4.3.3. Diagnostic tests of the estimated model

To ensure the quality of the model used to measure the effect of structural changes in monetary sterilization components on the exchange rate after implementing the electronic platform in Iraq during the period 2021–2024, and to verify that it is free from econometric issues, diagnostic tests were conducted as summarized in Table 4:

**Table 4:** Summary of Diagnostic Test Results for Model Quality

| Prob | F-statistic | Indicator | Test |
|---|---|---|---|
| 0.2569 | 1.719069 | Breusch-Godfrey Serial Correlation LM Test | Serial Correlation Test |
| 0.1768 | 1.939197 | Breusch-Pagan-Godfrey | Heteroskedasticity Test |
| 0.359769 | 2.044588 | Jarque Bera | Normality Test |

Reference: Prepared by the authors using Eviews 13.

Based on the results of Table 4 above, it is evident that the residuals of the estimated model do not suffer from serial autocorrelation, according to the Breusch–Godfrey Serial Correlation LM Test, where the probability value was Prob. Chi-Square = 0.8069, exceeding the significance level of 0.05. This supports accepting the null hypothesis of no autocorrelation and rejecting the alternative hypothesis.

Similarly, the Breusch–Pagan–Godfrey test indicates that the residuals do not exhibit heteroscedasticity, with a probability value of (Prob. Obs/R-squared = 0.1330), also greater than 0.05, supporting acceptance of the null hypothesis and rejection of the alternative.

Additionally, the Jarque–Bera test shows that the residuals are normally distributed, with a statistic of JB = 0.318818 and a probability of Prob = 0.8526, which is higher than 0.05, confirming the acceptance of the null hypothesis of normality.

Collectively, these diagnostic tests indicate that the estimated model possesses appropriate statistical properties, free from major issues such as autocorrelation, heteroscedasticity, and non-normality, which enhances the reliability of the results derived from it.

## 5. Conclusions

1) In Iraq, over the past few years, we have observed something interesting. The printing and circulation of money has had a significant impact on economic activity. Meanwhile, the dollar's impact on the parallel market has been minimal and statistically insignificant. The Iraqi economy is primarily oil-dependent; when oil revenues increase, economic conditions improve. The central bank's monetary policies, however, have not had the significant impact some might expect. Perhaps deeper changes are needed in the structure of the economy itself to reduce its vulnerability to external shocks.

2) The result is that economic growth in Iraq is significantly influenced by the interaction between the money supply and the parallel market exchange rate, with high sensitivity to structural changes that reflect the fragility of the economic structure and its heavy dependence on oil revenues.
3) The results show that the impact of local currency issuance on economic growth is linked to government spending financed by oil revenues, rather than increased domestic production capacity. This finding demonstrates the weakness of economic diversification, as GDP is more affected by fluctuations in global oil prices than by domestic monetary policies.
4) When the government increases the amount of money in circulation, this can help the economy grow, especially in stable conditions. However, at the same time, in situations of instability, an increase in the money supply can cause major problems. For example, we may notice a significant increase in prices. The value of the Iraqi dinar may begin to decline. This demonstrates that the success of monetary policy in Iraq depends on effective exchange rate management and financial stability.

## 6. Recommendations

1) Adopting a balanced monetary policy requires a strong focus on controlling currency issuance. It must be directed toward supporting the productive sector (such as industry, agriculture, and value-added services) rather than solely financing current government spending, to eliminate the risk of inflation.
2) Monetary expansion should be directed toward financing productive sectors such as agriculture, manufacturing, and financial technology. It is also recommended to gradually implement alternative mechanisms to currency auctions, such as transparent electronic platforms, to bridge the gap between the official and parallel exchange rates and enhance the stability of the dinar.
3) Enhancing transparency in currency management is crucial for boosting investor confidence and reducing the risks associated with exchange rate volatility. When information is clear to all, investor confidence increases, enhancing the credibility of monetary policy and supporting greater stability in financial markets.
4) Effective foreign exchange market management tools must be developed to bridge the gap between the official and parallel exchange rates, gradually reducing reliance on currency auctions and replacing them with more transparent policies that support the dinar's stability and enhance investor confidence. Ultimately, the goal is to build mutual trust among all parties. When trust improves, the situation is better for everyone.
5) We must encourage the public to continue investing in the capital markets, industrial, agricultural, and other productive sectors, as this will continue to exert pressure on monetary policy and influence the management of resources on economic growth.

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