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Analysis of the Monetary Policy Response to Oil Price Fluctuations in the Iraqi Economy for the Period 2004-2023

تحليل استجابة السياسة النقدية لتقلب سعر النفط في الاقتصاد العراقي للمدة ٢٠٠٤-٢٠٢٣

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Abstract:

Through the use of the ARDL model, a perfect instrument for examining the long-term link between economic factors, the study seeks to examine the relationship between oil price and monetary variables. Additionally, the study aims to determine the degree to which changes in the price of oil affect Iraq's monetary liquidity and exchange rate. To confirm the research hypothesis and employ standard procedures, standard models were constructed based on yearly data. The research found a long-term relationship (Co- integration) between the independent and dependent variables, according to the joint integration model (ARDL), and using the standard method, it became clear that the relationship between the independent variable OP, which expresses the oil price, and the broad money supply variable M_2 is a direct relationship, i.e. Assuming that all other variables influencing the model remain constant, a 1% increase in the price of oil results in a.0050776 million dinar increase in the variable M_2, and a drop has the opposite effect. There is no long-term equilibrium relationship between the oil price variable and the exchange rate in Iraq, and this result is contrary to the economic reality for rentier countries that depend heavily on oil revenues. Based on these results, the study recommends the necessity of the monetary authority adopting economic policies aimed at diversifying sources of public revenues and Monetary liquidity, and reducing dependence on oil as a primary source, given its association with fluctuations in global markets and its impact on oil shocks.

Keywords: Oil price, Monetary policy, Monetary liquidity, Exchange rate, ARDL.

المستخلص:

يهدف البحث الى تحليل العلاقة بين سعر النفط والمتغيرات النقدية من خلال أنموذج ARDL، الذي يعتبر أداة مثالية لتحليل العلاقة طويلة الأجل بين المتغيرات الاقتصادية. كما يسعى البحث إلى اختبار مدى تأثير تقلبات أسعار النفط على السيولة النقدية وسعر الصرف في العراق، ومن اجل التحقق من فرضية البحث وباستخدام الأساليب القياسية حيث تم بناء النماذج القياسية وفق بيانات سنوية. توصل البحث الى وجود علاقة طويلة الأجل (تكامل مشترك) بين المتغير المستقل والتابع وعلى وفق أنموذج التكامل المشترك (ARDL)، وباستخدام الأسلوب القياسي اتضح ان العلاقة بين المتغير المستقل OP والذي يعبر عن سعر النفط ومتغير عرض النقد الواسع M_2 بأنها علاقة طردية، أي إذا ارتفع سعر النفط بنسبة (١٪) فإن المتغير M_2 يزيد بمقدار (0050776.) مليون دينار ويحث العكس في حالة الانخفاض، بافتراض ثبات العوامل الأخرى المؤثرة في الانموذج. وعدم وجود علاقة توازنية طويلة الاجل بين متغير سعر النفط وسعر الصرف في العراق وهذه النتيجة مغايرة للواقع الاقتصادي بالنسبة للدول الريعية والمعتمدة على الإيرادات النفطية بشكل كبير. وبناء على هذه النتائج توصي الدراسة ضرورة اعتماد السلطة النقدية سياسات اقتصادية تهدف إلى تنويع مصادر الإيرادات العامة والسيولة النقدية، وتقليل الاعتماد على النفط كمصدر رئيسي، نظراً لارتباطه بتقلبات الأسواق العالمية وتأثره بالصدمات النفطية.

الكلمات الرئيسة: أسعار النفط، السياسة النقدية، السيولة النقدية، سعر الصرف، ARDL.

1 .Introduction:

In light of the economic transformations witnessed by the world, oil price fluctuations are one of the most prominent factors affecting the stability of national economies, especially in countries that rely heavily on oil revenues as a primary source of financing. The economy has faced complex challenges due to the dominance of oil, which makes the impact of its price fluctuations on the main economic variables of monetary policy such as the exchange rate and liquidity an important issue that requires in-depth study, hence the research problem. These changes affect, to varying degrees, directly and indirectly, which puts pressure on the Central Bank to set monetary policies that can contribute to achieving relative stability. It is the body responsible for controlling the achievement of monetary stability and balance in the exchange rate. The research problem is to study the impact of oil price fluctuations on the exchange rate and liquidity in Iraq, and how monetary policy responds to these effects. Rentier economies, such as the Iraqi economy, face major challenges as a result of their heavy dependence on oil exports as a primary source of revenue. This structural dependence reflects direct and profound effects on national economic stability, especially in light of the ongoing fluctuations in global oil prices. Changes in oil prices create unexpected impacts on many key economic variables, such as the exchange rate and liquidity, which poses challenges to the Central Bank of Iraq in implementing monetary policy efficiently to ensure economic stability. Oil price fluctuations have unanticipated effects on a number of fundamental economic factors, including liquidity and the exchange rate, making it difficult for the Central Bank of Iraq to effectively implement monetary policy in order to maintain economic stability. Theoretically, fluctuations in oil prices directly affect the exchange rate by affecting the level of foreign reserves, imports, and exports. These fluctuations may also lead to an increase or decrease in the inflation rate in Iraq due to their impact on domestic production costs and the import of basic goods. Moreover, oil price fluctuations may affect the level of liquidity in the economy, as high oil revenues can increase liquidity, while low revenues may reduce it. However, the quantitative and empirical understanding of these effects is still limited in the economic literature on Iraq. In this context, although there are many economic studies that have addressed the effects of oil price fluctuations on global economies, studies that focus on the Iraqi economy as a rentier economy that depends almost entirely on oil exports, still raise some questions about how these fluctuations affect monetary policies and need a clear and accurate answer.

Many previous studies have addressed the relationship between oil prices and economic variables, including the study (Abbas Al-Birmani & Rashid Al-Ramli, 2020) to prove the research hypothesis by measuring changes in oil prices on some monetary variables (exchange rate, narrow money supply, broad money supply, inflation rate) in Iraq during the period 1990-2020 using modern standard and statistical methods and techniques, in addition to identifying the characteristics and nature of the time series data used by conducting some tests including constant and joint integration tests, and applying models such as the hysteresis model, the error correction model, and others. The research found the impact of crude oil price shocks on the size of the money supply represented by the money supply in Iraq, which is reflected in the occurrence of economic problems such as inflation or economic recession.

The VAR framework, Granger causality tests, impulse response functions, and variance decomposition were used in Rodhan's (2024) study to examine yearly data from 1970 to 2021. Examining how changes in oil prices affect Iraq's GDP, imports, foreign reserves, and exports was the goal of the study. According to the Granger causality tests, there is a unidirectional relationship between oil prices and GDP, international reserves, imports, and exports. Given that factors other than local economic variables drive oil prices in global markets, this result is expected. Changes in oil prices are a major source of variation in the variables under study, according to the variance decomposition results. Additionally, the impulse response study demonstrated that changes in the price of oil have a significant effect on GDP, Iraq's imports, exports, and foreign reserves. As a result, the report suggests that economic officials give top priority to creating workable plans to diversify Iraq's economy and lessen its reliance on oil earnings. This strategy would lessen the negative impact that fluctuating oil prices have on the macroeconomic stability of the nation. Based on earlier research and studies. (Al-Doski, et al., 2022) addressed the determinants of public debt in Iraq for a time series between (1990-2020) and took a set of macroeconomic variables affecting public debt in Iraq, relying on previous research and studies. To achieve the purpose of the research, the descriptive analytical approach was used to describe the research variables, in addition to using the quantitative approach to build the basic economic model for

the research based on the Eviews12 program. The results showed a long-term relationship between the variables and an inverse relationship between public debt and oil prices. And a direct relationship between the exchange rate and inflation rate with debt.

Using quarterly data from the first quarter of 1990 to the fourth quarter of 2018, (AL-Shammari et al., 2020) investigated how oil shocks affected the Iraqi economy's real GDP, government spending, inflation rates, and unemployment rates. Using the VAR model, Johansen's cointegration test, and stimulated response functions, the findings showed that although oil income as a proportion of GDP decreased to 28.6% in 2015 from 42.4% in 2014, public spending did not decrease in tandem.

(Bawa et al., 2021) conducted an econometric study on the Nigerian economy, using the non-linear autoregressive distributed model (NARDL) to analyze data from the first quarter of 1999 to the fourth quarter of 2018, to understand the impact of oil price fluctuations on inflation. The results confirmed that if the oil price increases, the inflation rate will increase. The study recommended adopting a monetary policy by the central bank that contributes to controlling inflation rates to achieve price stability.

The study (Kudabayeva et al., 2024) revealed the relationship between oil prices and inflation rates, as rising oil prices have a negative impact on inflation and economic performance more broadly, and these effects vary from one country to another according to the level of economic development.

The study (Perez-Segura & Vigfusson, 2016) addressed the relationship between declining oil revenues and inflation and analyzed the relationship according to the SVAR autoregressive model for the G7 countries. The results showed that oil price shocks had a lesser impact on inflation during periods when dependence on oil decreased, compared to periods when the G7 economies relied heavily on oil. These results reflect the importance of shifting towards reducing dependence on oil, as the economy becomes more stable and less affected by oil price fluctuations, highlighting the benefit of the strategy of enhancing oil independence to achieve greater economic stability.

2. Literature Review:

Rentier economies, such as the Iraqi economy, depend on oil as a primary source of government revenue. Any change in oil prices directly affects the state budget, which in turn affects monetary policy, such as foreign reserves and exchange rate stability (Mohammed, 2022). Fluctuations in oil revenues affect monetary policy through changes in the size of foreign reserves and liquidity. When oil prices rise, government revenues increase, which enhances the ability of the central bank to stabilize the exchange rate and control inflation (Fiyatının Ekonomik Büyüme Üzerindeki Etkisi et al., 2019). Financial surpluses resulting from high oil prices are used to finance development projects, which supports the local economy and enhances confidence in the national currency (Choi et al., 2018). Oil revenues directly determine the size of government spending and monetary policy. When oil prices rise, more resources are available to support exchange rate stability and increase foreign reserves. In contrast, lower oil prices lead to a budget deficit, which requires additional financing through borrowing or reducing government spending, which negatively affects monetary stability. Conversely, lower oil prices reduce government revenues, which leads to lower public spending and reduces liquidity available in the market. In such cases, the ability of the government and the central bank to support economic activity may decline, which pushes the economy into recession (Rasheed, 2023). Inflation in Iraq is directly affected by oil revenues through two main mechanisms: During periods of high oil prices, large government spending resulting from financial abundance increases aggregate demand for goods and services. If not matched by parallel growth in domestic production, this leads to inflationary pressures. When oil prices fall, foreign reserves decrease, which leads to a decline in the value of the Iraqi dinar against foreign currencies. This decline increases the cost of imports, which leads to higher prices of imported goods, and thus higher inflation (Ben Salem et al., 2024). Oil plays a pivotal role in determining the stability of the exchange rate, as the government relies on oil revenues to provide the foreign currency reserves needed to maintain the stability of the exchange rate. During periods of high oil prices: Increased oil revenues boost the Central Bank’s foreign reserves, enabling it to intervene to support the dinar and maintain its stability. During periods of low oil prices: Declining revenues lead to a decrease in foreign reserves, which puts pressure on the exchange rate and may lead to a depreciation of the dinar. In this case, the Central Bank may resort to austerity policies or adjust the exchange rate, which negatively affects individuals’ purchasing power (Monitor, 2023). The Iraqi economy shows high sensitivity to fluctuations in oil prices, as these fluctuations are reflected in Monetary liquidity, inflation rates, and exchange rate stability. Therefore, strengthening

monetary policy and diversifying the economy to reduce dependence on oil are priorities for achieving economic stability.

3. Methodology and Data:

The research methodology is an analytical framework that combines standard methods and theoretical concepts to identify and analyze the effects of oil price fluctuations on the main economic variables in Iraq, the exchange rate, and Monetary liquidity. The ARDL (Autoregressive Distributed Lag) model will be used, as this model is one of the appropriate tools to test the long- and short-term relationships between economic variables to analyze time data for the period 2004-2023. Annual data were collected from its sources represented by the Central Bank of Iraq. The General Directorate of Statistics and Information, the Iraqi Ministry of Planning. OPEC to obtain oil price data. And to determine the relationship between these variables in the short and long term, this data provides a valuable set of information for the researcher to analyze the relationship and to answer the research problems raised.

3.1 Research Problem:

The research problem arises from the need to study how oil price fluctuations affect these important economic variables (exchange rate, Monetary liquidity). The answer to the central question raised by the research is: How do oil price fluctuations affect the exchange rate and Monetary liquidity in the Iraqi economy? Is there a long-term relationship between these variables and oil prices, which requires the Central Bank to adopt certain strategies to manage these effects?

3.2 Research Objective:

The research aims to examine the relationship between oil prices and key economic variables through the ARDL model, which is an ideal tool for examining the long-term relationship between economic variables. The research will also seek to test the extent to which oil price fluctuations affect monetary policy in Iraq, with the aim of providing practical recommendations that help the Central Bank of Iraq improve its response to oil market fluctuations. Through this research, and provide practical recommendations to decision-makers on how to manage this relationship to ensure the stability of the economy in the face of oil fluctuations.

3.3 Research Hypotheses:

This study assumes that there is an economically significant relationship between oil price fluctuations and monetary variables, including the exchange rate and liquidity. Based on the economic relationship that links oil price fluctuations to multiple impacts on rentier economies. Specific hypotheses are tested that represent the relationship between the variables, represented by "the effect of oil price fluctuations on monetary economic variables, including the exchange rate and liquidity, in the short and long term." It is divided into sub-hypotheses:

Hypothesis H_1: Oil price fluctuations lead to an increase or decrease in liquidity in the Iraqi economy, as high oil revenues contribute to an increase in liquidity, while low revenues lead to a decrease in it.

Hypothesis H_2: An increase in oil prices leads to an increase in the value of the local currency (the Iraqi dinar) by improving foreign reserves and increasing oil revenues, which contributes to the stability of the exchange rate.

Using the following formula, the research's general model is represented:

$$\mathbf{Y= a+ \sum_{i=1}^{n} \beta_i Yt_{-1} + \sum_{j=0}^{q} \gamma i X_{t-j} + \mu t \ldots\ldots\ldots (1)}$$

Through the equations, it is possible to estimate the ARDL model to measure the short- and long-term relationship, as follows:

$$\mathbf{\Delta M_{2t} = C+ \sum_{t-1}^{n} \propto_1 M2_{t-1} + \sum_{t-1}^{n} \propto_2 OP_{t-1} + \beta_1 OP + \mu_t \ldots. (2)}$$

$$\mathbf{\Delta ER_t = C+ \sum_{t-1}^{n} \propto_1 ER_{t-1} + \sum_{t-1}^{n} \propto_2 OP_{t-1} + \beta_1 OP + \mu_t \ldots. (3)}$$

where:

OP: Oil prices.

M_2: Monetary liquidity.

ER: Exchange Rate.

Δ: the first difference of the variable. C: constant limit. n: The upper limit of the optimal deceleration period.

∝1, ∝2: short-run slope.

β1: the long-run slope.

μt: denotes the stochastic error component.

4 .Results and Discussion:

4.1 Unit Root Test:

Verifying the stationarity of time series is a basic requirement to avoid spurious regression, which gives unrealistic results. To verify the stationarity of variables, the extended Dickey-Fuller (ADF) test was used before starting the statistical estimation of the model (Paparoditis & Politis, 2018). To ensure the stationarity of the time series of variables and determine the integration order of each variable separately. From observing the results of the extended Dickey-Fuller test, shown in Table 1, it is clear that the variables are not stationary at the level, Consequently, the alternative hypothesis is rejected and the null hypothesis is accepted, and the probabilities (Prob) for all variables at the level confirm the presence of a unit root in all cases Where OP variable is unstable in "None" and "Intercept" cases where the significance level is greater than 5%, but it is only partially stable in the presence of a trend (Trend & Intercept) where p = 0.0143. The other variables M2, ER are unstable in all cases. At the 1st difference all variables are stable i.e. the significance level is less than 5%. This property makes the data suitable for analysis using models such as ARDL which allow the existence of variables I(0) or I(1) but not I(2).

Table 1: Unit Root Test for Augmented Dickey-Fuller (ADF)

		At level			1st difference		
		None	**Intercept**	**Trend & Intercept**	**None**	**Intercept**	**Trend & Intercept**
Prob 5%	**OP**	0.1436	0.4280	0.0143	**0.0025**	**0.0207**	**0.0007**
	M_2	0.9967	0.9791	0.8968	**0.0490**	**0.0359**	**0.0056**
	ER	0.4635	0.8012	0.0599	**0.0046**	**0.0024**	**0.0010**

Source: Extracted from $Stata_{17}$ output

4.2 Cointegration Test Model M2:

The test parameter F-statistic reached (5.161) which is greater than its critical value estimated by (Pesaran et al. 2001) at the upper limit, which, as in Table 2, the first step in this model, shows the rejection of the null hypothesis and the acceptance of the alternative hypothesis, i.e., the existence of a long-term equilibrium relationship at a significant level Prob (0.05). This means the existence of joint integration between the variables, which confirms the existence of a long-term equilibrium relationship in at least one direction between monetary policy and global oil prices during the period (2004-2023).

Table 2: ARDL Bound test of the model M_2

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H_0: no levels relationship **F = 5.161**

t = -3.184

Critical Values (0.1 - 0.01), F-statistic, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_1	4.04	4.78	4.94	5.73	5.77	6.68	6.84	7.84

accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_1	-2.57	-2.91	-2.86	-3.22	-3.13	-3.50	-3.43	-3.82

accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)

Source: Extracted from Stata17 output

4.3 Analysis of ARDL Test Estimation Model M2:

After verifying the existence of long-term integration in the model according to the Bounds Test methodology, the results of the short-term and long-term estimators of the model parameters and the error correction parameter were reached, as in Table3 The results support the existence of a long-term integration relationship that moves from the independent variable to the dependent variable based on the (negative sign) of the error correction limit parameter (ECT) and its significance as expected and required, Hence, at a high significance level of 0.007 Prob, it reached -.1348367. Given the importance of the link, the alternative hypothesis was accepted and the null hypothesis was rejected because the error correction parameter needed to be negative and statistically significant. The broad money supply will rise by (.0050776) in response to a 1% increase in the price of oil (OP), and the converse will occur if it declines. The error correction model will correct any short-term imbalance in this connection from the long-term equilibrium, with a percentage of (-13.48%) of the imbalance from the previous year being fixed this year. Thus, the Monetary liquidity impact mechanism will adequately correct any deviations in the short-run dynamics from their long-run equilibrium. The coefficient of determination measured by R2 is 0.60, which means that 60% of the total changes in Monetary liquidity are accounted for by the explanatory variable, oil price, while the remaining 40% represents changes in the dependent variable that is not included in the equation.

Table ٣: Estimators the error correction parameter of the model

ARDL (2 1) regression

Sample: 2006 thru 2023

Number of obs = 18
R-squared = 0.6065
Adj R-squared = 0.4854
Log likelihood = 17.713411 **Root MSE = 0.1064**

	D.M2	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
ADJ							
	M2 L1.	-.1348367	.0423538	-3.18	0.007	-.2263364	-.0433369
LR							
	OP	.0050776	.0103291	0.49	0.631	-.017237	.0273922
SR							
	M2						
	LD.	-.2999296	.2204337	-1.36	0.197	-.7761475	.1762884
	OP						
	D1.	.0033989	.0013391	2.54	0.025	.0005059	.0062919
	_cons	2.552132	.7522813	3.39	0.005	.9269269	4.177337

Source: Extracted from Stata17 output.

4.4 Co-integration Test ER Model:

The test parameter F-statistic showed (5.161) which is lower than its critical value at the upper limit, This shows that the alternative hypothesis is rejected and the null hypothesis is accepted. i.e. the absence of a long-term equilibrium relationship at a significant level (Prob: 0.05) as in Table 4, which is the first step in this model.

Table 4: ARDL Bound test of the model ER

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H_0: no levels relationship **F = 1.299**
t = -1.604

Critical Values (0.1 - 0.01), F-statistic, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_1	4.04	4.78	4.94	5.73	5.77	6.68	6.84	7.84

accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_1	-2.57	-2.91	-2.86	-3.22	-3.13	-3.50	-3.43	-3.82

accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship
Critical values from Pesaran/Shin/Smith (2001)

Source: Extracted from Stata17 output

This means that there is a joint integration between the variables, which confirms the absence of a long-term equilibrium relationship, at least in one direction, between monetary policy and global oil prices during the period (2004-2023). This was confirmed by the error correction parameter, which was negative with a value of (-.2880056) and insignificant (0.128) as in Table 5. Here, the results were contrary to the research hypothesis and did not match the economic relationship that confirms the positive integration between the change in oil prices and the stability of the exchange rate in rentier countries whose economies depend on oil revenues to a large extent.

Table 5: Estimators the error correction parameter of the model

ARDL (1 0) regression

Sample: 2005 thru 2023

Number of obs = 19
R-squared = 0.1397
Adj R-squared = 0.0322
Log likelihood = -110.7827 **Root MSE = 89.8063**

	D.ER	Coefficient	Std. err.	t	P>|t|	[95% conf.	interval]
ADJ							
	ER L1.	**-.2880056**	**.1795231**	**-1.60**	**0.128**	**-.6685776**	**.0925664**
LR							
	OP	**-.8122671**	**3.208244**	**-0.25**	**0.803**	**-7.61344**	**5.988906**
SR							
	_cons	**388.1174**	**245.1526**	**1.58**	**0.133**	**-131.5829**	**907.8177**

Source: Extracted from Stata17 output.

4.5 Hypothesis Testing:

H1: Changes in the price of oil cause the Iraqi economy's liquidity to either rise or fall. The estimation result in Table 3 indicates that Iraq's monetary liquidity is significantly impacted by the price of oil. This indicates that the broad money supply was impacted by the oil price during the reviewed period. This result is consistent with the intuitive expectations that changes in oil prices are reflected in the oil revenues of rentier countries and thus positively or negatively affect Monetary liquidity in the economy.

H2: An increase in oil prices leads to strengthening the value of the local currency, which contributes to strengthening the exchange rate. The hypothesis that the oil price negatively affects the exchange rate in Iraq was rejected. According to the results in Table (3,4), there is no impact of the oil price on financing the exchange rate during the period under review.

4.6 Model quality test:

To ensure that the model is free from the problem of heteroskedasticity, it was verified through the (ARCH) test, where the absence of the aforementioned problem was diagnosed, as the results indicated the absence of the aforementioned problem because the value of (chi2) reached 0.846 with a probability value of 0.3577 exceeding the 0.05 level, and thus the null hypothesis, which states that there is no problem of heteroskedasticity in the model, which is shown in Table 6, cannot be rejected.

Table ٦: LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(*p*)	chi2	df	Prob > chi2
1	**0.846**	**1**	**0.3577**
H_0: no ARCH effects		vs. H1: ARCH(p) disturbance	

Source: Extracted from Stata17 output.

The results in Table 7 indicate that the independent variables explain about 14% of the changes in Monetary liquidity in Iraq. The estimated model is statistically acceptable, with the value of the (F) statistic test reaching (1.60) and the value of p-value (0.0279), which is less than the 5% significance level. As a result, the null hypothesis is rejected and the alternative hypothesis is accepted based on the overall significance of the calculated model. According to the Breusch-Godfrey test, it is also evident that the model is not affected by serial correlation because the probability value (Prob. Chai Square) achieved 0.9949 and is not significant at 5%. As a result, the null hypothesis is accepted and the alternative hypothesis is rejected. i.e. the absence of serial correlation, meaning the independence of values from each other.

Table ٧: Model Quality Test of the Model

Source	SS	df	MS		
Model	**.020113799**	**٣**	**.0067046**	**Number of obs**	**= 15**
Residual	**.122789897**	**11**	**.011162718**	**F (3, 11)**	**= 1.60**
				Prob > F	**= 0.0279**
				R-squared	**= 0.1408**
Total	**.142903696**	**14**	**.010207407**	**Root MSE**	**= .10565**

Parameters	Test values
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity **Variable: Fitted values of the residual term**	**chi2(1) = ٠.00** **Prob > chi2 = 0.9949**
Ramsey RESET test for omitted variables **Omitted: Powers of fitted values of the residual term**	**F(3, 8) = 0.39** **Prob > F = 0.7642**
Durbin–Watson d-statistic	**(4, 15) = 1.928083**

Source: Extracted from Stata17 output.

Furthermore, the results shown in Table 8 show that the model does not face the problem of heteroskedasticity, which is based on the Breusch–Pagan test, where the probability value (0.6918) exceeds the 5% significance level.

The Ramsey Regression Equation Specification Error Test (RESET) validates that the estimated model is correctly described. With an F-statistic of 0.39 and a corresponding p-value of 0.7642 that is greater than 5%, the null hypothesis is rejected and the alternative hypothesis is accepted, indicating that there is no specification error in the model.

Table **8: Breusch–Godfrey LM test for autocorrelation**

lags(*p*)	chi2	df	Prob > chi2
1	**0.087**	**1**	**0.7680**
H_0: no serial correlation			

Source: Extracted from $Stata_{17}$ output.

6 .Conclusions and Recommendations:

6.1 Conclusions:

1 .The independent variable (oil price) has a significant effect on Monetary liquidity, so we find that the explanatory power of the function reached (R2=0.60, meaning that the function explained (60%) of the variance of the dependent variable, broad money supply, which confirms the strength of the impact of the relationship with oil prices, while the remaining (40%) is attributed to other variables that were not included in the model.

2 .Fisher's statistical limits test provides evidence of the existence of a long-term equilibrium relationship between the model variables in the Iraqi economy. The long-term estimation results reveal the existence of a positive and significant elasticity between the oil price and Monetary liquidity in the short and long term. And the absence of a long-term equilibrium relationship with the exchange rate.

3 .Given that the significance level was higher than 5%, the RESET test findings validated the suitability of the model specification employed in the study. This confirms that the model is well-defined since it shows that the alternative hypothesis is accepted and the null hypothesis is rejected. Additionally, since the alternative hypothesis was rejected and the null hypothesis of variance stability was accepted, the Breusch–Pagan test demonstrated that the model is not heteroskedastic.

4. The presence of an effect and a positive association Monetary liquidity is negatively impacted by oil prices; for example, a one percent change in oil prices will eventually result in a.0050776 change in Monetary liquidity. In the case of a reduction, the converse occurs.

6.2 Recommendations:

Based on the results, the following recommendations are put forward:

1. The competent authorities must employ all available tools to ensure economic stability, in a way that enhances the achievement of revenues and Monetary liquidity in a sustainable manner.

2. The Iraqi government should adopt economic policies aimed at diversifying sources of public revenues, and reducing dependence on oil as a primary source, given its association with fluctuations in global markets and its impact on oil shocks.

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