



Measuring the Effect of Some Monetary Variables on the Gross Domestic Product in Iraq for the Period for the Period (2004-2020)

Nadia Khedir Gnawi

Department of Economics, College of Administration and Economics,
University of Al-Qadisiyah, Email: nadia.ganawe@qu.edu.iq

Douaa Hakim Fali

Department of Economics, College of Administration and Economics,
University of Al-Qadisiyah, hakimdoaa96@gmail.com

Received: November 8, 2021; reviews: 2; accepted: June 29, 2022.

Abstract

The researches aim to demonstrate the economic effects of monetary variables on the gross domestic product in Iraq, and to determine the direction of those effects and the nature of their impact on the Iraqi economy. ARDL methodology for model variables according to this methodology, as well as testing the problem of heterogeneity of variance and the problem of autocorrelation.

Keywords

Monetary variables, Gross Domestic

JEL Classifications: J11, F43

1. Introduction

Governments are working hard to achieve economic stability by controlling monetary policy tools, and to demonstrate this, an overall standard model was built to study the impact of some monetary variables represented by the broad money supply, the real interest rate and the exchange rate on the gross domestic product in Iraq for the period (2004-2020).

2. Research Importance

The importance of the research is to show the course of monetary policy and the effective impact of its variables on the gross domestic product, as well as

the possibility of following a monetary policy that leads to achieving a balance between cash flows and government spending to prevent inflationary pressures in light of the shocks and financial challenges that occur in most rentier countries because of their dependence on customs. And here comes the role of monetary policy in overcoming the problems and raising the level of GDP, thus increasing the levels of economic growth as a whole.

3. Research Problem

Is there a clear impact of monetary policy represented by its variables (broad money supply, real interest rates, and exchange rates) on the gross domestic product in Iraq during the period (2004-2020)?

4. Research Hypothesis

The research hypothesis includes the following:

There is a weak impact of monetary variables on the gross domestic product in Iraq because of the monetary policy and the rentier feature of the Iraqi economy, which represents a large percentage of the volume of GDP in it.

5. Research Objective

The objective of this research is determined by identifying the relationship of monetary variables to the gross domestic product in Iraq, and measuring the impact of monetary variables on the gross domestic product during the research period.

6. Research Methodology

The descriptive and standard approaches were used in the study of the title of the research to describe, analyze and measure the monetary variables included in the research and the gross domestic product in Iraq.

The First Topic is the Theoretical and Conceptual for Monetary Variables and Gross Domestic Product

Requirement is the Concept of Money Supply 1

The concept of money supply in the broad sense is one of the important concepts and is adopted by financial and monetary institutions, including the International Monetary Fund, and within the framework of this volume of money the narrow concept of money M1 in addition to accounts or time deposits and symbolized by the symbol (TD) as well as savings accounts in banks and symbolized by it with the symbol (S) and expresses the money supply equation in its broad sense M2 as follows:

$$M_2 = M_1 + TD + S \dots (1)$$

The money supply in the broad sense M_2 in Iraq witnessed successive increases at the beginning of the research period until 2007, and many factors came that contributed to the increase in the money supply in the broad sense in Iraq at the beginning of the period, and these first years were represented in the issuance of a new law for the Central Bank of Iraq aimed at preserving On its independence and playing the required role in the transition to a market economy as a cornerstone of the transitional tasks of the national economy, and a new unified national currency with international specifications in terms of paper quality, difficulty of counterfeiting and the ability to keep it to replace the poor local edition currency, In addition to taking successful steps to enhance foreign exchange reserves, especially after the Paris donors' conference, in which Iraq's debts became 120 billion dollars, after it was estimated between 500 to 600 billion dollars, and obtaining exemptions estimated at 80% of them and the rest are useless debts with the possibility of dropping them. It is the other, which supported the foreign cash reserve with the Central Bank, as it boosted its balance to reach 35 billion dollars as currency reserves, a healthy condition that the Iraqi economy has not witnessed for decades, when the foreign exchange reserves amounted to nearly 40 billion dollars following the nationalization of oil Correcting world prices and increasing Iraqi oil exports.

7. Real Interest Rate

The real interest rate is the rate of interest that an investor, saver, or lender receives (or expects to receive) after accounting for inflation. It can be more accurately described by Fisher's equation which states that the real interest rate is approximately the nominal interest rate minus the inflation rate. The Fisher equation gives the relationship between real and nominal interest rates and the expected inflation rate:

$$1) \dots (2) \quad + i = (1+r) (1+\pi_e)$$

The importance of the real interest rate is that when analyzing a loan or investment, it is difficult to obtain a clear picture of the real cost of the loan or the real return on investment, as the path of basic interest rates has important repercussions on the financial markets and the economy, as a result of high inflation, we find real interest rates At a historically low level, these extremely low real prices reflect the pessimism about economic growth in the coming years, The global savings glut caused by the lack of banking confidence and the lack of use of technologies in banking procedures, as well as the desire to increase the demand for safe assets as a result of the high uncertainty that is exacerbated by many external conditions and the accompanying global crises and turmoil as well as its reflection to form a state of instability The internal economic situation, as well as the security situation, increasing risks and other factors that discourage investment and play a role in the local economy.

8. Exchange Rate

The Iraqi dinar exchange rate witnessed major changes, especially in the eighties and nineties of the last century and the beginning of the current century, which witnessed the third Gulf War, due to the political and economic challenges facing the Iraqi economy, and the parallel exchange rate of the Iraqi dinar moved away from the official exchange rate, as well as On the emergence of multiple arrangements at the unofficial exchange rate, in addition to the pluralism in exchange rates that resulted from the unfavorable conditions witnessed by the Iraqi economy, And what was imposed by the mismanagement of the national economy at that time, the number of these prices reached (17) official and parallel prices until 2003, when the Iraqi dinar exchange rate against the dollar witnessed a significant and massive deterioration in its value "in the parallel market, during the nineties, due to the depletion of reserves Iraq's foreign currency and the freezing of Iraq's assets deposited abroad, which contributed to the weakening of monetary policy and the curtailment of the central bank's role in controlling the exchange rate of the Iraqi dinar due to the nature of the goals and orientations of the financial and banking system and its subjection to political decisions more than of a banking nature .

Since 1990, a period that was characterized by the imposition of a comprehensive economic blockade until that period ended with the fall of the regime in 2003, and as a result of the severe deficit in the foreign exchange reserves of the government, the parallel black market played a major role in supplying and financing commercial activity in hard currencies, which was characterized by indiscipline and chaos. Which made this market suffer from severe fluctuations in the local exchange rate against other currencies, especially the dollar.

9. Gross Domestic Product

The gross domestic product in its general form is expressed in economic growth, and it is also one of the most important indicators of economic performance adopted by the countries of the world, including Iraq, as it is one of the most widely used and comprehensive criteria to show the country's total production of all goods and services, as well as knowing the flaws in the structure and the possibility of addressing them. Calculating it according to real or fixed numbers or current prices, which take the inflation rate into account, through them, the level of economic progress for that country is measured, and the countries of the world are interested in diversifying the components of that output and making sure that all sectors contribute to it. As for the Iraqi economy, it has been suffering for decades from deep imbalances in the volume of GDP, due to its heavy dependence on oil to generate output, and this It made him more exposed to the outside world and his inability to rely on a variety of resources.

The Second Topic: The Matrix of Correlation Coefficients and the Stability of Time Series

1. Correlation coefficients matrix: For the purpose of determining the degree of regression of the relationship between the variables under study, the following matrix of correlation coefficients table was adopted:

Table 1. Matrix of Correlation Coefficients

Correlation					
	GDP	M2	INT	EXCH	
GDP	1.000000	0.802866	-0.167382	-0.699063	
M2	0.802866	1.000000	0.051406	-0.657650	
INT	-0.167382	0.051406	1.000000	-0.188116	
EXCH	-0.699063	-0.657650	-0.188116	1.000000	

Source: From the researcher's work based on the statistical program Eviews.

Table (1) refers to the relationship between the variables, as it shows the strength and direction of the relationship between the variables and it is clear that there is a correlation between them and the direction of the positive relationship between the broad money supply and the gross domestic product and the direction of the negative relationship between real interest rates and the gross domestic product, as well as the case with exchange rates, However, this correlation, in addition to being unable to determine the direction of influence between the variables, does not provide sufficient evidence for the existence of a causal relationship. These variables may be functionally related to each other (functionally) oriented to just synchronicity in their movements or affected by common factors among them, so it will be adopted Standard regression models and the use of tests to verify the validity of these associations.

2. Testing the stability of time series: The analysis of time series is an important step before the stage of estimating and testing the relationship between economic variables, to ensure the stability (stationers) of these variables and to know their statistical characteristics. But if the time series are unstable, we will see a problem called spurious regression, and until this is addressed, we will rely on unit root tests to ensure the stability of the variables and determine the degree of their integration, and despite the multiple choices of the unit root, we will We focus on using two tests:

- Extended Dickey and Fuller Test1979, which allows the inclusion of a number of time-gap differences until the autocorrelation problem disappears.

- The choice of Philips-Perron1988. In 1981, Dickey and Fuller developed three different equations to test the existence of a unit root, the first equation being without a fixed term.

As for the second equation, it contains only the fixed term, while the third contains the constant term and the general direction, and the error terms (et) in

the equation are the ones that are characterized by (white noise) and have the desired properties.

The Dickey-Fuller test can be explained by the following formulas:

The first formula: without a fixed limit and without a time direction.

$$\Delta Y_t = \delta Y_{t-1} + \mu_t$$

As it is:

Y_t : The time series of the economic variable whose stability is to be tested.

μ_t : Random Variable It is assumed that it has an independent normal distribution with a constant variance and an arithmetic mean equal to zero. This assumption is referred to as follows: $U_i \sim N(0, \sigma^2 U_i)$

Δ : the first difference of the series, ($\Delta Y_t = Y_t - Y_{t-1}$).

δ : represents the parameter of the decelerated variable.

The second formula: includes a fixed term and no time direction.

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + \mu_t$$

As it is:

β_1 : represents the γ -section parameter (constant boundary).

The third formula: includes a fixed term and a time trend.

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \mu_t$$

As it is:

2β : time trend parameter.

t : time trend, the purpose of entering it into the model is to get rid of spurious correlation and remove non-random directions.

Conducting the (DF) test using the first formula requires calculating the so-called values for the purpose of testing the following hypotheses:

1. The null hypothesis: ($H_0 : \delta = 0$)

2. Alternative Hypothesis: ($H_1 : \delta < 0$)

To determine the appropriate length of time slots (m), criteria such as (Akaike info Criterion (AI) or (Schwartz info criterion (SC) (Final Prediction error (FPE) are used.

In the case of making sure that the model is free of the autocorrelation problem, the calculated value (T) is compared with the tabular values specially prepared for that by (Dickey-Fuller), which are called critical values at the sample size (n) and the level of significance (1%, 5%, 10%), because the distribution of parameters differs from the normal (t) distribution, so the tabular values differ as well. Surface Analysis),

Through a formula, if the required values are substituted into it, the critical values, which are sometimes referred to by the term (MK Critical tau values) for unit root and cointegration tests, can be obtained, which are:

Otherwise, the second difference is taken and the test steps are repeated to find out the degree of stability of the variable in question. However, taking the differences to obtain stability will delete important probabilistic information about the relationships between the studied variables in the long term, so it is necessary

to ensure that there is a long-term equilibrium relationship between the variables by means of the co-integration test and (Cointegration test).

In order to verify the quiescence of the time series of the economic variables used in the analysis, the Expanded Dickey-Fuller method (ADF) was used to test the unit root of the time series. To explain this, the probability parameter (prob) was relied on. When the value of (prob) is greater than (0.05), the parameter is not significant (that is, the calculated t is less than the critical t), but if it is less than (0.05), the parameter is significant.

Table 2. Dickey Fuller Expanded ADF Test

UNIT ROOT TEST RESULTS TABLE (ADF)					
Null Hypothesis: the variable has a unit root					
<u>At Level</u>					
		GDP	M2	INT	EXCH
With Constant	t-Statistic	-2.2778	-2.2509	-3.6371	-2.9160
	Prob.	0.1822	0.1911	0.0076	0.0491
		n0	n0	***	**
With Constant & Trend	t-Statistic	-2.1958	-1.1213	-3.8687	-2.6355
	Prob.	0.4834	0.9165	0.0192	0.2666
		n0	n0	**	n0
Without Constant & Trend	t-Statistic	-0.5479	-0.7202	-0.8203	-0.7887
	Prob.	0.4758	0.4005	0.3567	0.3705
		n0	n0	n0	n0
<u>At First Difference</u>					
		d(GDP)	d(M2)	d(INT)	d(EXCH)
With Constant	t-Statistic	-2.0751	-1.9245	-2.3968	-2.7614
	Prob.	0.2552	0.3191	0.1467	0.0697
		n0	n0	n0	*
With Constant & Trend	t-Statistic	-2.3790	-2.5548	-2.4239	-3.0077
	Prob.	0.3867	0.3019	0.3641	0.1384
		n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-2.1359	-2.0398	-2.4074	-2.7135
	Prob.	0.0324	0.0406	0.0167	0.0074
		**	**	**	***

Source: From the researcher's work based on the statistical program Eviews.

The table indicates that the model's variables have settled after taking the first difference, so it has become necessary to use the ARDL model, because the most important features of this model are its ability to estimate the relationship between the variables, whether they are stable in the level or in the first difference or a combination between the two, and this is considered The model is more efficient in the case of small samples such as the research sample, and the application of this model enables us to obtain the most efficient estimate of the long and short-term parameters.

As for the phillips-perron test, it depends on the same equation above, but it differs from the simple and expanded Dickey-fuler test in the way it deals with the presence of autocorrelation, as it performs a non-parametric correction for the statistic (t) for parameter (δ) and has a better and more accurate testing ability, especially when the sample size is small.

Table 3 shows the results of the Phillips-Peron test.

Many time series are unstable at their levels but become stable in the first difference.

Table 3. Stability of Variables According to the Philips-Burn Test (Pp)

UNIT ROOT TEST RESULTS TABLE (PP)

Null Hypothesis: the variable has a unit root

		<u>At Level</u>			
With Constant	t-Statistic	GDP -1.9514	M2 -1.8425	INT -2.2669	EXCH -2.0875
	Prob.	0.3073	0.3571	0.1857	0.2503
		n0	n0	n0	n0
With Constant & Trend	t-Statistic	-1.3461	-0.1150	-2.3891	-1.5754
	Prob.	0.8671	0.9936	0.3816	0.7918
		n0	n0	n0	n0
Without Constant & Trend	t-Statistic	0.4665	-0.7114	-0.3405	-1.1040
	Prob.	0.8127	0.4047	0.5586	0.2420
		n0	n0	n0	n0
		<u>At First Difference</u>			
With Constant	t-Statistic	d(GDP) -2.2671	d(M2) -2.6783	d(INT) -2.5411	d(EXCH) -2.9543
	Prob.	0.1857	0.0835	0.1109	0.0449
		n0	*	n0	**
With Constant & Trend	t-Statistic	-2.5640	-3.0046	-2.5780	-3.1889
	Prob.	0.2978	0.1392	0.2915	0.0960
		n0	n0	n0	*
Without Constant & Trend	t-Statistic	-2.2991	-2.7242	-2.5485	-2.8955
	Prob.	0.0219	0.0072	0.0115	0.0044
		**	***	**	***

Source: From the researcher's work based on the statistical program Eviews.

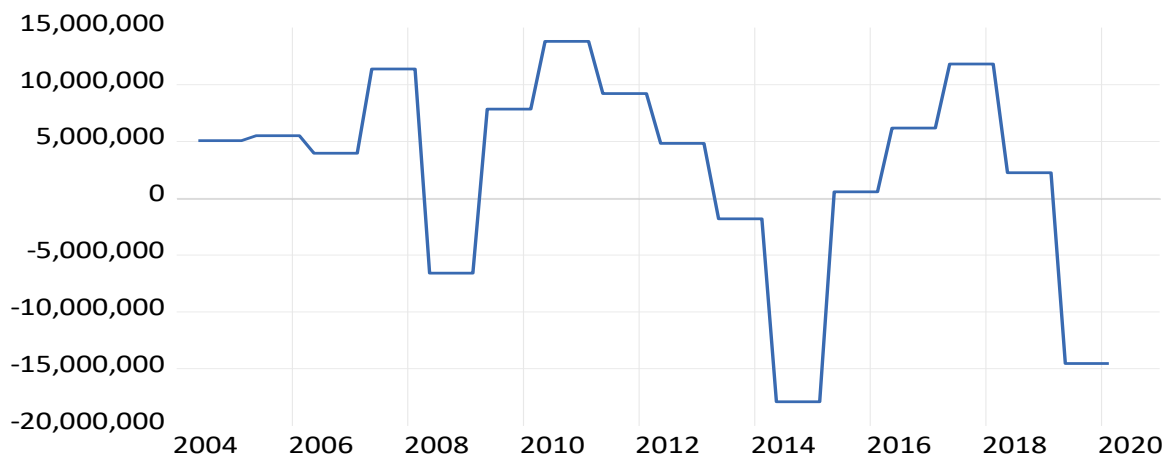
Table 3 shows the results of the Phillips-Peron test.

As we note that the dependent variable and the independent variables are stable when the first difference is taken, and this can be shown through the following graphs:

Below are the graphs of the variables under consideration, which are static in the first difference.

Shape (1)

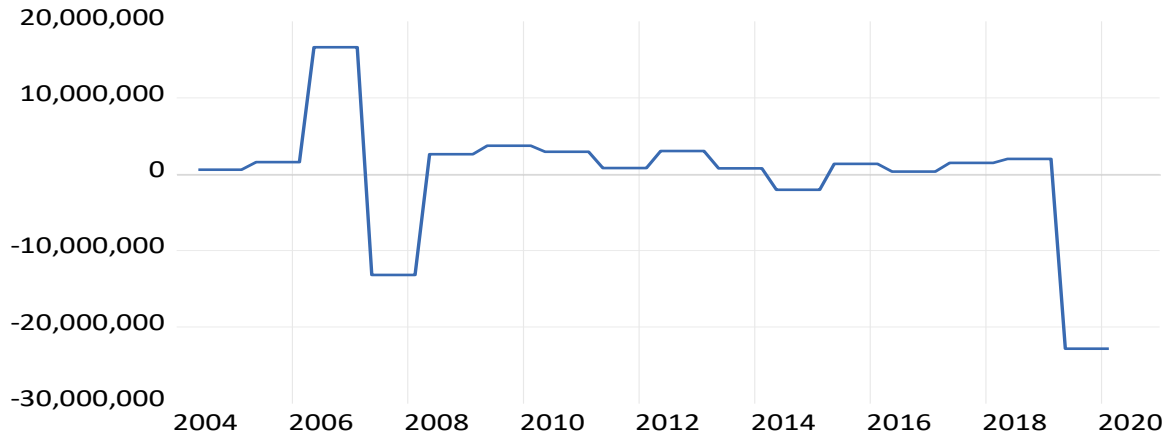
Differenced GDP



Source: From the researcher's work based on the statistical program Eviews.

Shape (2)

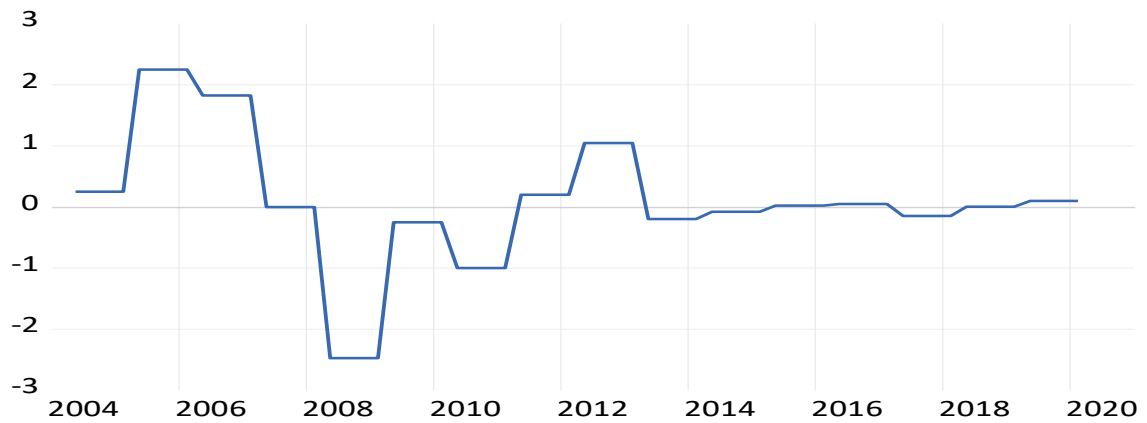
Differenced M2



Source: From the researcher's work based on the statistical program Eviews.

Shape (3)

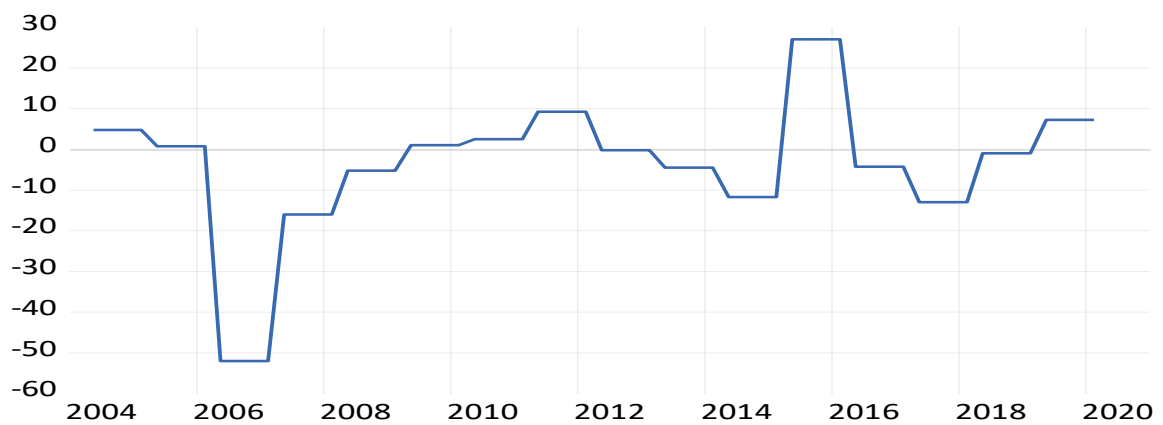
Differenced INT



Source: From the researcher's work based on the statistical program Eviews.

Shape (4)

Differenced EXCH



Source: From the researcher's work based on the statistical program Eviews.

The Third Topic: Estimating the Model and Analyzing the Results

Estimation of an Autoregressive Model of ARDL.1

Co-integration was tested according to the ARDL methodology through the Bound Test method developed by (Pesaran 2001), The time series is a function of slowing down its values and the values of the current explanatory variables, and slowing them down by one or more periods , The ARDL method is distinguished from the traditional methods used for co-integration testing by several advantages:

1. The ARDL model can be used regardless of the degree of integration of the variables, whether they are at the level, the first difference, or a mixture between the two.

2. It also gives the best results for the parameters in the long term.

3. The ARDL model is statistically more important than other models in determining co-integration in the case of small samples or observations.

The rejection of the null hypothesis depends on comparing the calculated F value with the tabular values within the critical limits proposed by (Pesaran 2001), where the table consists of two terms: the lower limit value (Lower Critical Bound, LCB), which assumes that the variables are integrated of degree $I(0)$ And the upper limit value (Upper Critical Bound UCB), which assumes that the variables are integrated of degree (1).

On the contrary, if the calculated F is less than the LCB, then the null hypothesis is accepted (cointegration), but if the calculated F value falls between the UCB and the LCB, in this case the result is undecided in the case of co-integration between the variables.

Estimation of the Autoregressive Model of Distributed Deceleration (ARDL)2

The estimated model is based on the independent variables represented by the broad money supply, real interest rates and exchange rates, and that the time lag period is (2,0,1,1) based on the values of (Akaike) (AIC), which gives the lowest value for this criterion and is automatically determined from Before the program, as the duration of the time slowdown was determined to (2) two time lags for the GDP variable and no time lag for the money supply variable, and one time lag for each of interest rates and exchange rates according to the (Akaike) criterion, and as shown in the following table:

The statistical tests of the model show the significance of these tests and the quality of the estimated model through the modified (R²), which is (0.99), as well as the (F-Statistic) value of (1866,587) and at the level of statistical significance (0.000000). Therefore, we accept the null hypothesis (H₀), that is, there is no autocorrelation problem for the error limit in the estimated model.

The Boundary Test for Co-Integration 3

To ensure the presence or absence of co-integration between the model variables, we adopt the boundary test as shown in the table below:

Table 4. Autoregressive Model Estimation of ARDL

Dependent Variable: GDP				
Method: ARDL				
Date: 04/29/22 Time: 23:15				
Sample (adjusted): 2004Q3 2020Q1				
Included observations: 63 after adjustments				
Maximum dependent lags: 4 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (4 lags, automatic): M2 INT EXCH				
Fixed regressors: C				
Number of models evaluated: 500				
Selected Model: ARDL(2, 0, 1, 1)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	1.691924	0.075423	22.43233	0.0000
GDP(-2)	-0.772757	0.070290	-10.99388	0.0000
M2	0.096244	0.037509	2.565872	0.0130
INT	1593074.	851182.3	1.871601	0.0666
INT(-1)	-1866503.	864395.9	-2.159315	0.0352
EXCH	42314.21	52503.35	0.805934	0.4238
EXCH(-1)	-73284.39	49101.18	-1.492518	0.1413
C	51770332	21527755	2.404818	0.0196
R-squared	0.995808	Mean dependent var	1.93E+08	
Adjusted R-squared	0.995275	S.D. dependent var	65496225	
S.E. of regression	4502221.	Akaike info criterion	33.59621	
Sum squared resid	1.11E+15	Schwarz criterion	33.86835	
Log likelihood	-1050.281	Hannan-Quinn criter.	33.70324	
F-statistic	1866.587	Durbin-Watson stat	2.147105	
Prob(F-statistic)	0.000000			

Source: From the researcher's work based on the statistical program Eviews.

Table 5. Limits Test for Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	4.669489	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Finite Sample: n=65				
Actual Sample Size	63	10%	2.492	3.35
		5%	2.976	3.896
		1%	4.056	5.158
Finite Sample: n=60				
		10%	2.496	3.346
		5%	2.962	3.91
		1%	4.068	5.25

Source: From the researcher's work based on the statistical program Eviews.

Table (5) shows the results of the joint integration test using the boundary test methodology, as it was found that the calculated values of the F-Statistic test amounting to (4.669489) are greater than the tabular upper bounds of the F-statistical values according to the sample size and the degree of freedom at the level of significance (5%). This indicates the existence of co-integration between the studied variables, that is, we reject the null hypothesis and accept the alternative hypothesis that there is a long-term equilibrium relationship.

10. Ardl Error Correction Model (Ecm)

Estimation of the short-term relationship: The short-term relationship is represented by estimating the error correction model (ECM), which represents the expression of the variables used in the first difference formula with the addition of a slowed error correction term for one period of time (ECMt-1) as an explanatory variable, and the error correction limit measures the speed of Adjusting the short-term imbalance to the long-term equilibrium.

Table 6. Estimating the Relationship in the Short Term

ARDL Error Correction Regression				
Dependent Variable: D(GDP)				
Selected Model: ARDL(2, 0, 1, 1)				
Case 2: Restricted Constant and No Trend				
Date: 04/29/22 Time: 23:19				
Sample: 2004Q1 2020Q4				
Included observations: 63				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	0.772757	0.063755	12.12076	0.0000
D(INT)	1593074.	579956.0	2.746887	0.0081
D(EXCH)	42314.21	35278.34	1.199439	0.2355
CointEq(-1)*	-0.080833	0.016152	-5.004542	0.0000
R-squared	0.770731	Mean dependent var	2561252.	
Adjusted R-squared	0.759074	S.D. dependent var	8856049.	
S.E. of regression	4346925.	Akaike info criterion	33.46922	
Sum squared resid	1.11E+15	Schwarz criterion	33.60529	
Log likelihood	-1050.281	Hannan-Quinn criter.	33.52274	
Durbin-Watson stat	2.147105			

Source: From the researcher's work based on the statistical program Eviews.

Table (6) shows the error correction model and the short-term parameters of the model variables. As the results indicate that there is no effect of the money supply in the broad sense and the exchange rate on the gross domestic product in the short term, while the indication of the interest rate was positive, which is contrary to the expectations of economic theory, and the error correction limit parameter indicates the existence of a long-term equilibrium relationship between the two variables under discussion. In the short term, the value of the error

correction parameter shows that about 8% of the short-term imbalance in the previous period (t-1) can be corrected in the current period (t) to restore the state of equilibrium in the long term when any change or shock occurs in the explanatory or independent variables.

Estimating The Long-Term Relationship 5

Table 7. Shows the Effect of Monetary Variables on GDP in the Long Run

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(GDP)				
Selected Model: ARDL(2, 0, 1, 1)				
Case 2: Restricted Constant and No Trend				
Date: 04/29/22 Time: 23:17				
Sample: 2004Q1 2020Q4				
Included observations: 63				
Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2	1.190654	0.397478	2.995518	0.0041
INT	-3382642.	2372143.	-1.425986	0.1595
EXCH	-383137.1	157101.6	-2.438786	0.0180
C	6.40E+08	2.27E+08	2.819210	0.0067

EC = GDP - (1.1907*M2 -3382641.5635*INT -383137.1207*EXCH + 640459215.2141)

Source: From the researcher's work based on the statistical program Eviews.

We note from the table that the effect of the money supply and exchange rate variables is statistically significant, as the value of Prob. (0.0041) is less than 5%, so we accept the null hypothesis and reject the alternative hypothesis that states that there is no long-term equilibrium relationship, and that the direction of this The relationship is from the value of the broad money supply to the direction of the value of the gross domestic product, as an increase in supply by one unit leads to an increase in the gross domestic product by (1.19) units in the long term, and this shows us the positive impact of the broad money supply on the gross domestic product as for the prices of The interest, as it reached Prob.(0.1595) which is greater than 5%, Therefore, we reject the null hypothesis and accept the alternative hypothesis that there is no long-term relationship between interest rates and GDP. As for exchange rates, it reached Prob. (0.0180), which is less than 5%, so we accept the null hypothesis and reject the alternative hypothesis that states that there is no A long-term equilibrium relationship, due to the main reason being the rentier Iraqi economy.

11. Test the Autocorrelation Problem

This test is done to judge the extent to which the model has passed the standard tests, as shown in the table below:

Table 8. Test the Autocorrelation Problem

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.613092	Prob. F(2,53)	0.5455
Obs*R-squared	1.424580	Prob. Chi-Square(2)	0.4905

The results showed that the estimated model is free from the autocorrelation problem in terms of the Breusch-Godfrey Serial Correlation LM Test, as it reached the value of Prob. Chi - square (0.4905) as shown in Table (8), which is greater than (0.05), that is, we accept the null hypothesis which states that the residuals are not autocorrelated.

Testing the Heterogeneity Problem 7

Table 9. Testing the Heterogeneity Problem

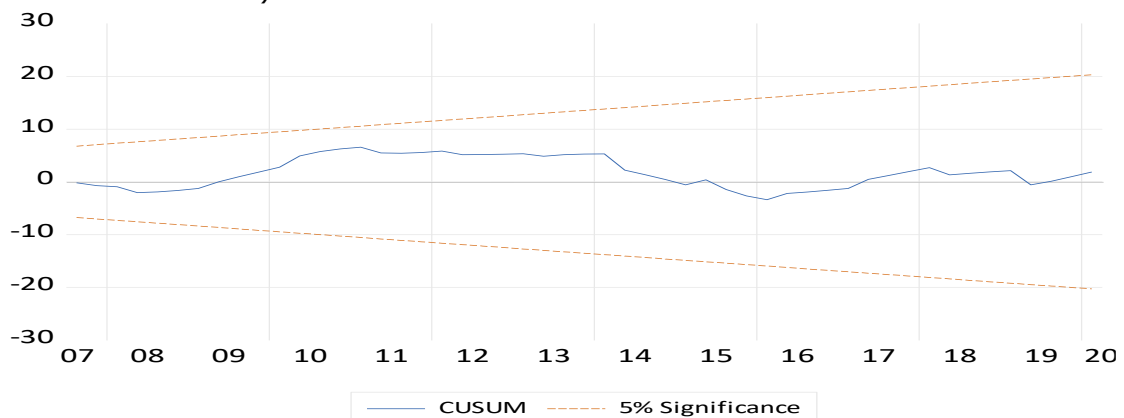
Heteroskedasticity Test: ARCH			
F-statistic	0.152482	Prob. F(1,60)	0.6976
Obs*R-squared	0.157165	Prob. Chi-Square(1)	0.6918

Source: From the researcher's work based on the statistical program Eviews.

To make sure that the residuals do not suffer from the problem of variance, we find that the value of Prob. Chi-square for the Heteroskedasticity Test ARCH has reached (0.6918 which is greater than 5%, and accordingly we accept the null hypothesis which states that the residuals are homogeneous and does not contain the problem of heterogeneity of variance.

11. Stability Test for ARDL Model Parameters

(CUSUM) (1. Cumulative sum of remainders (The Cumulative Sum of the recursive residuals)



Source: From the researcher's work based on the statistical program Eviews.

From the graphs, it is clear that the estimations are stable over time within the confidence limits or within the critical limits at the 5% level, meaning that we

have no more than one equation, which confirms that the variables are stable over time and that the ARDL model is the optimal model for the presence of consistency in the model between the results of correction Error in the short and long term.

(SUSUMSQ) (2. Cumulative sum of residual squares test (The Cumulative Sum residuals squared

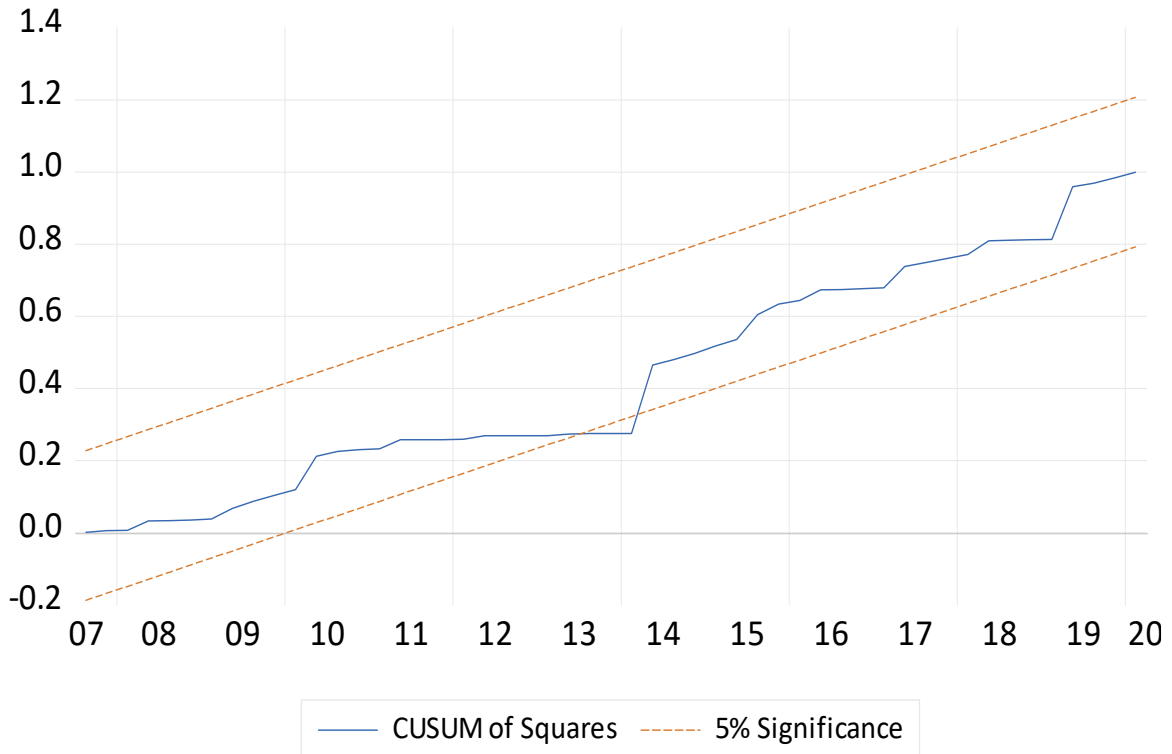


Figure 5. Estimated and actual model residuals
Source: From the researcher's work based on the statistical program Eviews.

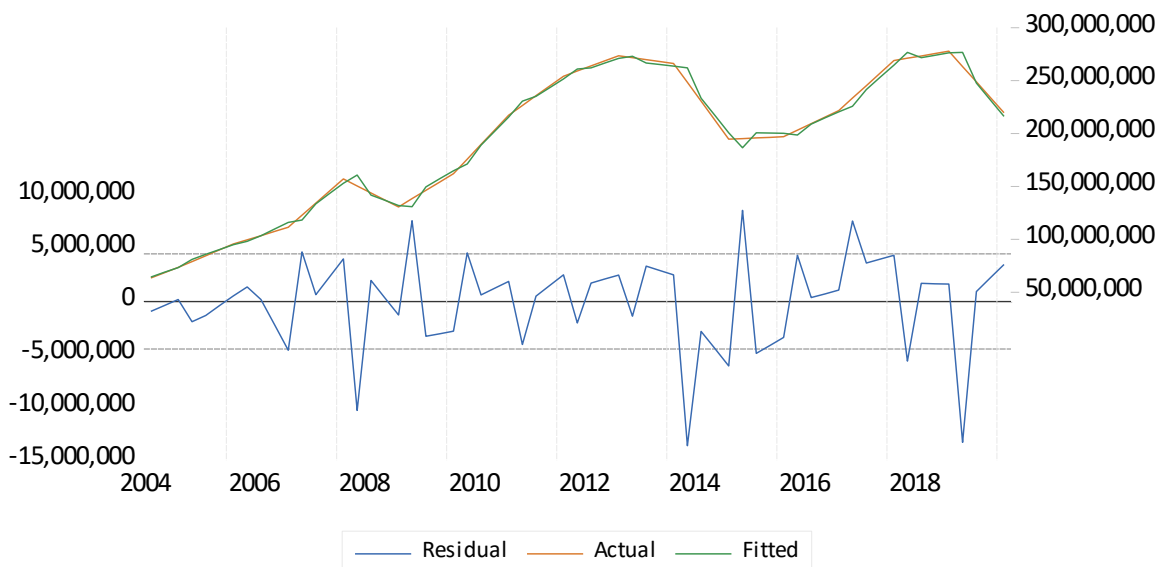


Figure (5) indicates the conformity of the estimated and actual residuals of the model and reflects the accuracy and quality of the model estimated according to the (ARDL) methodology.

Source: From the researcher's work based on the statistical program Eviews.

We conclude from the above that monetary variables have a limited impact on economic growth represented by GDP in the short and long terms, despite the existence of a long-term equilibrium relationship between the variables of the model. This is due, as everyone knows, to the rentier nature of the Iraqi economy and its dependence on the oil sector mainly, and the lack of The effectiveness of monetary policy sometimes in influencing indicators of economic growth.

12. Conclusions

Through the research, a number of conclusions were reached, the most important of which are:

1) Proving the validity of the research hypothesis, which is that monetary variables have a weak impact on the gross domestic product in Iraq because of the monetary policy and the rentier feature of the Iraqi economy, which represents a large percentage of the volume of GDP in it.

2) The results indicate that there is no effect of the broad money supply and the exchange rate on the gross domestic product in the short term.

3) The error correction limit parameter indicates the existence of a long-run equilibrium relationship between real interest rates and GDP in the short run.

4) There is a long-term equilibrium relationship that is from the value of the broad money supply towards the value of the gross domestic product. As for the real interest rates and exchange rates, the results indicate the absence of a long-term parallel relationship and the reason is due to the rentier character of the Iraqi economy.

13. Recommendations

1) The necessity of the Iraqi monetary authorities directing towards following appropriate monetary policies with the possibility of coordination between the monetary and fiscal policies to contribute to raising the volume of the gross domestic product.

2) Paying attention to the diversity of the production base and attention to the front and back links of the sectors Economic without concentrating production and interest only in one sector without the other economic sectors.

3) Take measures aimed at increasing exports, limiting imports, encouraging capital flows and increasing remittances flows of workers abroad, with the aim of increasing foreign exchange revenues, eliminating the deterioration in the balance of payments and thus limiting the deterioration of the value of the national currency.

4) Encouraging the private, foreign and mixed sectors to invest by providing the necessary guarantees and facilities to carry out investment projects while enhancing the competitiveness of projects and developing human resources according to market requirements in a way that guarantees job opportunities for them.

5) Work to achieve a balance between money supply and demand, because any imbalance in the money market is reflected in the local market for goods and services and the balance of payments, thus causing an imbalance in net foreign assets.

References

- al-Nabi, W. I. A., the foreign currency auction and its role in the stability of the Iraqi dinar exchange rate, research published on the website of the Central Bank of Iraq without a year of publication. 23. Retrieved from <https://cbi.iq/page/37>
- Al-Wardi, A. (1990). "Statistical Prediction Methods, Methods and Applications," Basra University. 258.
- Baltagi, B. G. (1999). *Econometrics*, 2nd Edition, Verify Berlin Heidelberg New York. USA. 370.
- Carl, T. L. (2008). *The Perils of Oil Countries*, translated by Abdul-Ilah Al-Nuaimi, 1st Edition, Center for Iraqi Studies, Baghdad. 111.
- Dimitios Asterion, S. G. H. (2007). *Applied Econometrics*, palgraveMacmillan Ltd. New York. 295.
- Eichhorn, W., & Voeller, J. (2012). *Theory of the Price Index: Fisher's Test Approach and Generalizations* (Vol. 140), 49: Springer Science & Business Media
- Fatima Abed Jawad, N. A. A. (2011). *The Economic Effects of Taxes in Iraq for the period 1971-2005*, General Tax Authority, Ministry of Finance, Baghdad. 24.
- Khaled Wassef Al-Waznia, A. H. A.-R. (2002). *Principles of Macroeconomics between Theory and Practice*, Wael Publishing House, first edition. 52-53.
- Muhammad Salih Salman al-Kubaisi, A. M. K. (2012). Analyzing the causal relationship between exchange rate changes and inflation rates in the Iraqi economy for the period (1980-2009), University of Kufa, College of Administration and Economics. 1(4), 18.
- Parchure, R. (2009). Fisher's equation: some methodological doubts. 219.
- Pesaran, M., Shin, Y. Smith, R. (2001). Bound Testing Approaches to the Analysis of Level Relationship. *Journal of Applied Econometrics*, 16, 289-329.
- Salih, M. M. (2012). *Monetary Policy of Iraq*, 1st Edition, House of Wisdom, Baghdad. 30.