

A STATISTICAL STUDY TO SHOW THE IMPACT OF BANKING SYSTEM DEPOSITS ON THE GROSS DOMESTIC PRODUCT IN IRAQ DURING THE PERIOD (2005-2020)

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ABSTRACT	KEYWORDS
Monetary variables (bank deposits and cash credit) are considered important variables in monetary policy in developing and developed countries alike, especially by providing financing for the development process and providing cash liquidity needed by investment activity, but Iraq is the exception to that as it did not rely much on the commodity sectors in creating added value, because the economy depends on external variables, including the rentier resource coming from the extractive sector. Does monetary policy and the weak role of the central bank in economic activity in Iraq during the period (2005-2020), and statistical and standard tests were used that showed the presence of stability of the variables in the first difference, and the lack of self-correlation between the variables, and the heterogeneity of the variation between the studied variables, in addition To the substantiality of the model, which means the possibility of activating monetary policy in Iraq to influence economic activity.	Bank Deposits, Cash Credit, Monetary policy, Error Correction vector

INTRODUCTION

The deposits of the banking system, in both its current and fixed parts, should be employed to indicate their impact on the gross domestic product, in addition to the effect of cash credit granted by the banking system in both its governmental and private parts, and pledged credit. dependent and independent variables, to contribute to assisting the set of monetary policy to activate the role of monetary variables in economic activity and achieve the desired goals for which they were set, and the possibility of getting rid of problems associated with monetary variables, and making monetary policy

effective and intertwined with fiscal policy to achieve stability in the general level of prices, and address problems economy, including inflation and unemployment.

The statistical descriptive analysis of the study variables, represented by the Gross Domestic Product (GDP) as a dependent variable, bank deposits and cash credit as an independent variable, and Pledge Credit as an independent variable, for the purpose of measuring and estimating the regression equation for the model variables on According to the VECM methodology, achieving results that are consistent with the theoretical hypotheses of the statistical model, and showing the accuracy of the theoretical signals for this relationship, and through which an explanation can be provided for the phenomenon under study, or the possibility of predicting the future behavior of the study variables.

Research hypothesis: The study was based on the following hypotheses

1-Bank deposits and cash credit in Iraq did not contribute to activating monetary policy in Iraq during the period (2005-2020)

2-There is a strong correlation between the independent monetary variables represented by bank deposits and cash credit, and the dependent variable represented by the gross domestic product in Iraq.

Search goal:

1-Analysis of cash credit and bank deposits in the Iraqi economy during the period (2005-2020)

2-Analyzing the impact of monetary policy on the gross domestic product in Iraq.

3-Knowing the impact of monetary variables that were not included in the model by knowing the impact of the variables that the model includes.

Research problem:

Despite the presence of financial abundance in the banking system, it did not play the role of commodity sectors in economic activity, due to the ineffectiveness of monetary policy and its lack of ability to interact with fiscal policy during the period (2005-2020)

First: Standard Model Description

Standard statistical tests, like other sciences, are based on a logical sequence in testing and analysis, as any standard study goes through four stages as follows.(**Abdel-Qader: 2004, 16**)

The first stage: dealing with and setting statistical hypotheses and choosing the appropriate model for it

The second stage: It is concerned with the estimation process and the use of appropriate statistical tests after estimating the model parameters, whether it is simple or multiple.

The third stage: evaluating the estimation process of the model

The fourth stage: predicting the future of the phenomenon under study

1-The model variables:

The statistical study in the analysis depends on a successive set of steps, where each step is based on the previous one, and because statistics is a tool for analyzing theory, in addition to that the theory sets hypotheses that explain the behavior of the variables to be studied, testing time series through statistical laws and theories and making appropriate decisions to address Economic problems.(**Ibrahim & others: 2002, 18**)

The description and formulation of hypotheses in a standard statistical manner is the process of linking the studied problem through its variables that affect it, depending on theoretical hypotheses, and for this reason the description will be as follows.(**Ali: 2011, 10**)

a-The dependent variable: Gross Domestic Product (GDP), and the annual data was obtained through the annual statistical bulletins issued by the Ministry of Planning.

b-Independent variables: Bank deposits (BD), which shows the role and effectiveness of monetary policy in affecting GDP, while the other independent variable that is expected to affect GDP is cash credit (CC).

The mathematical formulation of the model is in the form of a mathematical equation, as in equation (1), that this relationship has an exact form and is devoid of a random variable.(**Wallis: 2001, 71**)

$$GDP_t = f(CC_t, BD_t) \dots \dots \dots (1)$$

And after adding the random variable for the purpose of measuring it as in equation (2)

$$GDP_t = B_0 + B_1CC_1 + B_2BD_2 + \varepsilon_t \dots \dots \dots (2)$$

For the purpose of obtaining standard statistical tests that reflect the impact of variables on economic activity and the role of monetary policy in Iraq, the researchers used a time series of (17) observations extending up to the year (2020).

Table (1): Gross Domestic Product, Cash Credit, and Bank Deposits in Iraq for the Period (2005-2020)

YEAR	GDP	CC	BD
2005	65798566.8	1717450	10769995
2006	85431538.8	2664898	16928295
2007	100100817	3459020	26188926
2008	147641254	4587454	34524959
2009	120429277	5690062	38582477
2010	146453469	11721535	47947232
2011	192237070	20344076	56150094
2012	227221851	28438688	62005935
2013	243518659	29952012	68855487
2014	236708036	34123067	74073336
2015	185550902	36752680	64344061
2016	186397294	37180123	62398733
2017	220905644	37952829	67048631
2018	221765433	38486947	76893927
2019	224654191	42052511	82106425
2020	222441755.8	49817737	84924168

Source:

1-Ministry of Planning, Central Agency for Statistics and Information Technology, Annual Statistical Abstract, National Accounts, different years.

2-Ministry of Finance, Annual Bulletin, General Budget Department, various years

Second: Testing the stability of the variables

The characteristic of stillness and stability for each variable is very important, because it enables the researcher to detect false regression, and in order to avoid false regression, one must rely on tests prepared for that, through which the researcher can predict the future of the phenomenon, and statistical tests are an important tool in drawing monetary policy for the model under study. (Milis: 2009, 592)

And that the test is compatible with the nature of the variables, and the probability (prob) is chosen with a degree of (0.05), when it is less than (0.05) it means that the variable is static and stable, and if the probability is higher or equal to (0.05) it means that it is not static, and whenever, that is, not The future of the variable can be predicted. (Al-Sawai: 2011, 191)

1-Dickie Fuller Stability Test:

The modified Dickie-Folar test is considered one of the stability tests, and it is one of the unit root tests, knowing the static, getting rid of the instability and converting it into a stable series by taking its first difference, and when testing it is necessary that the amount of random error (U_t) be unrelated through the following hypotheses. (Dickey & Fuller: 2006, 482)

Null hypothesis: the existence of a unit root, i.e. instability

Alternative hypothesis: no root

The (ADF) depends on the stability of the variable X_t , for example, on the estimation in the following way (OLS). (Mohamed: 2013, 125)

$$model(i): \Delta x_t = \lambda. X_{t-1} - 1 \sum_{j=2}^p \phi_j \Delta x_t - j + 1 + \varepsilon_t \dots \dots \dots (3)$$

$$model(ii): \Delta x_t = \lambda. X_{t-1} - 1 \sum_{j=2}^p \phi_j \Delta x_t - j + 1 + c + \varepsilon_t \dots \dots \dots (4)$$

$$model(iii): \Delta x_t = \lambda. X_{t-1} - 1 \sum_{j=2}^p \phi_j \Delta x_t - j + 1 + c + bt + \varepsilon_t \dots \dots \dots (5)$$

After conducting the test as shown in Table (2), the results of the model test using (ADF), were as follows:

a- The test values (GDP) of the gross domestic product in the Iraqi economy for the period (2005-2020): it was unstable (At Level) in the case of a constant, constant and trend, or without them, and after taking the first difference for the same variable, it was stable in the case of The absence of a constant trend at the level of (5%) and it was stable in the first difference.

b- The variable (BD) bank deposits in Iraq during the period (2005-2020): The test was conducted for the time series at the level, and the variable was unstable, and when taking the first difference, the variable was stable, static, and integrated from the rank (I(1)).

c- The results of the variable (CC) cash credit in Iraq during the period (2005-2020): After conducting the test, it was found that the variable is unstable in constant, constant and trending, without constant and general trend, at the level (At Level), and the two researchers tested cash credit After taking the first difference, the results of the test were that the variable is static and stable with the constant, constant and direction, and without them, i.e. it is integrated of order (I(1)).

d- This result necessitates the researchers to use the (VECM) methodology because it is compatible with the degree of rest of the model

Table (2) Results of the Dickie Fuller Root Unit Test (ADF) at the level and first difference

UNIT ROOT TEST RESULTS TABLE (ADF)				
Null Hypothesis: the variable has a unit root				
At Level				
		BD	CC	GDP
With Constant	t-Statistic	-1.5954	-2.5573	-2.3024
	Prob.	0.4038	0.8376	0.1024
		n0	n0	n0
With Constant & Trend	t-Statistic	-1.94740	-2.7592	-1.2603
	Prob.	0.1673	0.2128	0.4392
		n0	n0	n0
Without Constant & Trend	t-Statistic	-0.6942	0.9471	0.9372
	Prob.	0.4102	0.9073	0.7091
Significan		n0	n0	n0
At First Difference				
		d(BD)	d(CC)	d(GDP)
With Constant	t-Statistic	-5.3632	-6.32911	-3.1672
	Prob.	0.001	0.001	0.2201
		***	***	n0
With Constant & Trend	t-Statistic	-2.8992	-6.4302	-2.3531
	Prob.	0.0046	0.000	0.3905
		***	***	n0
Without Constant & Trend	t-Statistic	-2.9004	-6.40310	-2.2365
	Prob.	0.0432	0.000	0.0261
Significan		***	***	**
a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant				
b: Lag Length based on SIC				
c: Probability based on MacKinnon (1996) one-sided p-values.				

Source: From Eviews 12

Third: Diagnostic Tests

1-The problem of autocorrelation:

One of the problems facing multiple regression is the lack of self-correlation between the values of the random variable (U_t) in year (t) and its value in other years, whether previous or subsequent, meaning that the values are independent and agency.(Baltagi: 2011, 212)

$$COV(U_t, U_{t-s}) = 0 \dots \dots \dots (6) , (t = 1, 2, \dots n)$$

It means that the phenomenon under study in the year (t) does not affect the phenomenon in the previous year (t-1), or the phenomenon in the subsequent year (t + 1), while the reality shows otherwise and the error limit of the random variable in a certain period has a relationship with Another period of time, and the problem of autocorrelation appears because there are reasons for it.(**Bakhit & Fathallah: 2014, 189**)

a- Extended effects of time series data

b- The process of processing and refining the data and reducing the percentage of inaccuracy in it.

c - Incorrect formulation of the model, which leads to distortion of the form of the functional relationship between the variables under study.

d - Omitting the independent variables that are difficult to characterize and obtaining accurate data about, leads to making the random variable include the associated variables, and then (Ut) not only reflects the random error in the model, but reflects the omitted variables.

2-Autocorrelation Test:

There are many methods for analyzing the correlation between variables and detecting the problem of self-correlation through the basic assumptions on which the multiple standard statistical model is based. (**Granger & Newbold: 2017, 121**) meaning that the values of the random variable are independent and express equality in the covariance of successive errors, which is evidence of the failure of the selection process This requires re-evaluating the model.(**Hashman: 2006, 195**)

After conducting the LM Tests on the model, it was found that it does not suffer from self-correlation and that the probability value was greater than (5%), meaning that it is not significant, which prompts the researchers to accept the null hypothesis, i.e. gross domestic product (GDP) and cash credit (CC) and bank deposits (BD) do not suffer from autocorrelation as in Table (3).

Table (3) Autocorrelation test

Residual Serial Correlation LM Tests						
Date: 03/30/23 Time: 12:03						
Sample: 2005 2020						
Included observations: 16						
Null hypothesis: No serial correlation at lag h						
Lag	df	Rao F-stat	Prob.	df	LRE* stat	Prob.
1	(9, 75.6)	0.61002	0.7828	9	5.551003	0.7802
2	(9, 75.6)	0.28763	0.9783	9	2.661792	0.9761
Null hypothesis: No serial correlation at lags 1 to h						
Lag	df	Rao F-stat	Prob.	df	LRE* stat	Prob.
1	(9, 75.6)	0.610771	0.7819	9	5.551971	0.7893
2	(18, 79.7)	0.777057	0.7105	18	14.18040	0.7248
*Edgeworth expansion corrected likelihood ratio statistic.						

Source: From Eviews 12

3-The problem of consistency of variance homogeneity:

The hypothesis of stability of the error limit is unrealistic to explain the capabilities of the model, and it is difficult to stabilize the variance of the remainder in the regression equation, so the problem of inhomogeneity occurs, and the phenomenon of heterogeneity of variance affects the estimates under study. The error (U_i) in the regression model is fixed variance, which means that there is a case of homogeneity of variance, which means that there is a state of instability for variance, which is that the estimators represent the best linear estimators of the model and are unbiased, and it is called (Heteroscedasticity), which is the opposite case of the first case. (Pindyck, & Rubinfeld: 2004, 581) So if The imposition of homogeneity of variance was not achieved in the error limit, as this means the inability to estimate the parameters at a significant level and with the least variances. One of the negative results of the problem is heterogeneity. The prediction is in the dependent variable or the independent variables by relying on the estimators and their flexibility, that is, the prediction is insignificant and inefficient. Because the prediction includes the variance of the error term (U_i) in addition to the variance of the estimates of the model.(David: 2000, 581)

4-Test for homogeneity of variance of the model:

The researchers relied on the (Goldfeld-Quandt) test, and it requires arranging the observations according to the variables, and it is assumed that the problem is due to a difference in variance, and that the test equation in the model consists of three variables, one of which is a dependent variable:

$$GDP_i = B_1 + B_2CC_1 + B_3BD_2 + u_i \dots \dots \dots (7)$$

The first step is to estimate the equation and the residual is (u_i), and then estimate the regression of the sum of squares of the residuals from the regression equation on the three variables, and note the value of (Chi-sq) and the level of (Prob) if it is less or greater than (5%) through the equation (8) Based on the results of (Eviews 12).

$$\widehat{GDP}_i^2 = \alpha_1 + \alpha_2CC_{2i} + \alpha_3BD_{3i} + \alpha_4CC_{2i}^2 + \alpha_5BD_{3i}^2 + \alpha_6CC_{2i}BD_{3i} + v_i \dots \dots (8)$$

Under the validity of the null hypothesis, there is no difference in the variance of the error limit, and it is proved that it results from multiplying the sample size (n) with the modified coefficient of determination (R^2) obtained by the researchers from the regression in equation (8), where (Chi-sq) With degrees of freedom equal to the variables, and the result is that the value of (Chi-sq) in the report (Eviews 12) as in Table (4) is greater than the value (Chi-sq), where the value of (prob) was (0.0001), and we conclude that there is a stability of variance, And the absence of a problem in the model and that the values of the estimators did not suffer from false regression, as they are used to predict the future of the statistical phenomenon, that is, the relationship between (GDP) during the period (2005-2020), and the independent variables, through the test of homogeneity of variance in Table (4) The equation of the model and the calculation of the residuals and the data for the three variables were estimated with a significance of (5%), the value of (Chi-sq) is equal to (126.7), and this means that there is a stability of variance, and that the model does not include the problem, so the researchers see that the best methodology for estimating the parameters according to (VECM), and finding the effect of the independent variables on the gross domestic product.

Table (4) results of the homogeneity of variance test

Residual Heteroskedasticity Tests (Levels and Squares)					
Date: 03/30/23 Time: 12:46					
Sample: 2005 2020					
Included observations: 17					
Joint test:					
Chi-sq	df	Prob.			
126.7396	72	0.0001			
Individual components:					
Dependent	Chi-sq(12)	Prob.	F(12,30)	R-squared	Prob.
res1*res1	37.51995	0.0001	16.11	0.88	0.001
res2*res2	5.299881	0.9707	0.36	0.13	0.95
res3*res3	24.00507	0.0052	3.16	0.56	0.03
res2*res1	18.69309	0.0723	1.83	0.44	0.08
res3*res1	25.79990	0.0016	3.85	0.58	0.02
res3*res2	16.13796	0.1780	1.56	0.31	0.19

Source: From Eviews 12

Fourthly: Estimating the model using the (VECM) Methodology

The (VECM) methodology used by the two researchers is after making sure that all variables are stable in the first order (I (1)), and the (VECM) methodology is characterized as contributing to reducing the residuals to the lowest possible level, so that the estimators with this methodology reduce the error limit to the lowest possible level. **(Hall: 2005, 282)**

By estimating the dependent variable in terms of the stable explanatory variables by the first difference, which is used to detect the random walk of the variable's values over time, for the purpose of differentiating between static and non-static random walk, if the general trend of the variable is predictable, and not a variable that will express the estimation of the variables in a manner Ideally, and vice versa if it is static in the plane or in the second difference and is called a random general direction. **(Gujarat: 2015, 1033)**

The use of the vector error correction model (VECM) to estimate the regression equation in the case of the presence of one dependent variable (Vector Error Correction Estimates), the method of error correction presented by (Granger) and (Engle) means reconciling the behavior of variables in the short term with its behavior in In the long term, the field of variables is constantly and gradually evolving. **(Abdel-Qader: 2007, 263)**

The researchers relied on the results of the programming package (Eviews 12) to reveal the estimates of the relationship between the dependent variable represented by gross domestic product (GDP), cash credit (CC) and bank deposits (BD), after estimation, the error correction coefficient was negative and significant, as in Table (5). Means:

1- The correction for fluctuations is made by (-1.3%), meaning that every (1%) change in monetary credit (CC) leads to changes by the correction factor in GDP.

2-A change of (1%) in bank deposits (BD) leads to changes in (GDP), by a correction coefficient of (-5.4%), where the relationship is inverse between the dependent variable and the independent variables.

3-The logarithmic function represented the model best through its capabilities, as the value of the coefficient of determination (R^2) showed the amount of error in the model and was represented by the variables that were not in the model, so its amount was (38%), while the variables included in the model affect the The dependent variable by (62%).

4-The (F) test represents the significance of the model estimated by the (VECM) method, through the calculated (F) test value that is (7.4) and is greater than the tabular (F) value. Using the results of other studies because they passed the condition of significance of the model.

Table (5) Error Correction Model (VECM)

Vector Error Correction Estimates			
Date: 03/30/23 Time: 12:45			
Sample (adjusted): 2009 2020			
Included observations: 16 after adjustments			
Standard errors in () & t-statistics in []			
Cointegrating Eq:	CointEq1		
LOG GDP (-1)	1.000000		
LOG CC(-1)	-2.3108		
	(2.9E-08)		
	[-0.41348]		
LOG BD (-1)	-5.03E-08		
	(2.8E-08)		
	[-1.82397]		
C	-10.48049		
Error Correction:	D(UN)	D(CC)	D(CC)
CointEq1	-0.36483	146338.9	146338.9
	(0.08515)	(58380.4)	(58380.4)
	[-4.21553]	[2.50664]	[2.50664]
D(LOG(GDP(-1)))	0.684490	43336.85	43336.85
	(0.14193)	(97305.2)	(97305.2)
	[4.82287]	[0.44537]	[0.44537]
D(LOG(CC(-1)))	1.50E-07	0.892365	0.892365
	(2.5E-07)	(0.17311)	(0.17311)
	[0.55548]	[5.15488]	[5.15488]
D(LOG(BD(-1)))	-1.26E-08	0.037303	0.037303
	(1.1E-07)	(0.07473)	(0.07473)
	[-0.10687]	[0.49917]	[0.49917]
C	-0.237460	238555.2	238555.2
	(0.16311)	(111827.)	(111827.)
	[-1.45585]	[2.13325]	[2.13325]
R-squared	0.6413	0.815648	0.752245
Adj. R-squared	0.6264	0.777694	0.701237
Sum sq. resids	9.586095	4.51E+12	2.39E+13
S.E. equation	0.530984	364045.5	837598.1
F-statistic	7.4876	21.49001	14.74748
Log likelihood	-28.67094	-592.9694	-627.9663
Akaike AIC	1.741473	28.61759	30.28411
Schwarz SC	2.072458	28.94857	30.61509
Mean dependent	-0.022619	978855.7	-417150.4
S.D. dependent	0.766084	772110.8	1532399.

Source: From Eviews 12

Conclusions and Recommendations

First: conclusions

- 1-The explanatory variables of the model are influential in a reasonable and logical degree and reflect the role of monetary policy in economic activity, as indicated by the flexibility coefficient through the (t) test.
- 2-The decrease in the corrected coefficient of determination indicates the presence of other monetary variables that were not included in the model, affecting the monetary policy in Iraq.
- 3-The weakness of the impact of bank deposits on the gross domestic product during the period (2005-2020) is due to the weak banking awareness of the Iraqi society and the weak confidence in the banking system, which indicates the inefficiency of Iraqi banks and their inability to attract local savings from the business sector and family savings.
- 4-The effect of cash credit on the gross domestic product was not at the required level and is not in line with the logic of the theory and the prior and expected theoretical expectations of the variable under study.

Second: Recommendations

- 1-The necessity of supporting the banking system and activating the role of monetary policy in economic activity through quantitative and qualitative tools, and focusing on qualitative tools, including preferential prices, and moral persuasion.
- 2-Facilitating the mechanism for granting loans to the business sector by defining a work team that studies the appropriate mechanism for that, which is commensurate with the reality of the Iraqi economy, and focus on activating the private banking system and following up on its activity.
- 3-Work by the Ministry of Planning and Finance and the Central Bank to create a stable environment, to carry out realistic reforms and not to rely excessively on the rentier economy.
- 4-Working to unify efforts in monetary policy through interaction, coordination, and relying on the analysis of the money market and the commodity market to activate aggregate demand that creates an increase in resources, stimulate investment, and activate cash credit and bank deposits.

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