IJEP International Journal of New Political Economy

DOI: 10. 52547/jep.3.2.159

Asymmetric Effects of Monetary Policy on Commercial Banks Deposits in Iraq

Aras A. Miho[1], Zahra Karimi Takanlou[2], AliReza Fazlzadeh[3], Habib Aghajani[4]

ARTICLE INFO

Article history:

Date of submission: 26-08-2022

Date of acceptance: 10-10-2022

JEL Classification:

G21

E52

E58

Keywords:

Banks

Monetary Policy

NARDL Approach

ABSTRACT

This study propose and test a new channel for the transmission of monetary policy, when monetary policy changes banks respond to the interest they charge on deposits and affects directly on the size of banks deposits and, thus, affects lending power of commercial banks. Given this issue in mind, this study examines the asymmetric effects of monetary policies on commercial banks deposits in Iraq. The study applied Unit root test, Nonlinear autoregressive distributed lag (NARDL) approach, Error correction model (ECM), Bound test and Wald test using monthly data spanning from Jan 2005 to Dec 2019. Policy Interest Rate (IR), Cash Reserve Requirement (RR), and Broad Money Supply (M2) were used to proxy the monetary policies. Bank Deposit (BD), were used as the proxy of the Iraqi commercial banks deposit. The findings of NARDL show a non-linear relationship between monetary policies and Banks deposit. Furthermore, the results of Bound test and ECM confirmed the existence of the long run and short run relation between monetary policies and commercial banks deposit in Iraq. Finally, the result of Wald test indicates that policy interest rate and reserve requirement has asymmetric effect on banks deposit, while money supply has symmetric effect. Hence, it is suggested that policy makers in Iraq should consider the positive and negative shocks of monetary policy as commercial banks respond asymmetrically to the monetary policy Instruments.

1. Introduction

Deposits are the primary source of funding for banks. Their stability makes them particularly well-suited for funding risky and illiquid assets. As

This article is extracted from the doctoral thesis of the Aras A. Miho

1. Ph.D. Candidate, Faculty of Economics & Management, University of Tabriz, Tabriz, Iran. (Corresponding author), Email: aras.miho@dpu.edu.krd.

2. Associate Professor, Faculty of Economics & Management, University of Tabriz, Tabriz, Iran.

3. Associate Professor, Faculty of Economics & Management, University of Tabriz, Tabriz, Iran.

4. Assistant Professor, Faculty of Economics & Management, University of Tabriz, Tabriz, Iran.

a result, the deposits channel has implications for bank lending. Deposits also represent the primary source of safe and liquid assets for households. As a result, the deposits channel also has implications for the overall supply of safe and liquid assets in the economy and for the price of liquidity in financial markets. Furthermore, deposits are special for both banks and households. As they are an essential source of bank funding that is more stable and dependable than alternative sources, mainly short term wholesale markets. This stability confers banks with an advantage in investing in risky and illiquid assets (Hanson, Shleifer, Stein, and Vishny 2015). The literature suggests that the monetary policy directly affects the bank performance. In order to make a profit, for instance, commercial banks invest customers' deposits in various short-term and long-term investments. However, the core of such deposits is used for loans. Hence, the more loans and advances they extend to borrowers, the more profit they make (Solomon, 2012). Within this context, the contribution of this paper is to show that banks transmit changes in monetary policy to the real economy through the supply of deposits, and that they do so as a result of market power in deposit markets.

There are two approaches concerning the effecting of monetary policies on lending power of the banks. The first perspective was proposed by Modigliani (1986), who argued that the banks face the deficiency of financial resources when the legal reserves of banks is increased but the deposit rates decreased, and the banks that cannot replace the other financial resources will decrease their loan supply. The second view on lending ability of the banks is articulated by Bernanke and Blinder (1992), and he confirmed the former perspective. According to the second perspective, the banks and financial centers that have a high level of liquidity can properly replace the other financial resources and keep a balance in offering the credits and facilities if they face (or experience) the monetary shocks. It should be mentioned that both approaches have been grounded on credit perspective.

On the other hand, suppose that the central bank resorts open (free) market operations to collect liquidity and implements a contractionary monetary policy to lower the aggregate demand. The use of this policy decreases the bank deposits, and it makes the commercial banks lower their loan supply. Reduction in bank lending could decrease economic activities. The businesses or consumers, that cannot find other investment resources but largely dependent on bank loans as their main financial resources, will not be able to buy the high-quality goods and they may overlook the capital assets. All these will lead to a reduction in economic activities. Hence, the bank's implementation of a contractionary monetary policy in lending will reduce the purchasing power of the consumer (Udoh et al., 2021). Moreover, the banks could react differently to the economic shocks, particularly the monetary shocks based on the bank size. Their access to the liquidity and their investment could be also different. The commercial banks have large liquidity, assets, and investments; therefore, they function well in replacing the resources or offering facilities when they experience the contradictory monetary shocks. However, the smaller banks have to reduce their facilities as they have low liquidity, investment and property (Brissimis & Delis, 2009).

2. Literature Review

Many studies have been conducted on monetary policy and its effects on the performance of banks. In the literature on deposit markets, Neumark and Sharpe (1992) and Hannan and Berger (1991) argued that deposit rates are downward-rigid and upward-flexible as a result of market power. Driscoll and Judson (2013) show that average deposit rates adjust asymmetrically to interest rate changes. Acharya and Mora (2015), Hortacsu et al. (2015) document large reallocation of deposits across banks during the financial crisis. Gilje, Loutskina, and Strahan (2016) and Ben-David et al. (2015) showed that banks channel deposits to branches located in areas with high loan demand**.**

According to Drechsler et al. (2017), monetary policy transmission should be understood from the liability side of banks' balance sheets. They argued, in particular that there is a "deposits channel" through which policy rate increases widen deposit rate spreads, resulting in deposit outflows that reduce banks' lending capacity. Repullo (2020) demonstrated that, contrary to their claim, increases in the policy rate have ambiguous effects on the equilibrium amount of deposits in their theoretical model of imperfect competition in a local banking market. Increases in the policy rate always increase the equilibrium deposit amount.

A study by Amaliawiati et al. (2013) focused on the relationship between BI rate, i.e. one of the monetary policies of the Indonesian central bank interest rate, and the profitability of conventional commercial banks listed on the Indonesia Stock Exchange from 2005 to 2012. By using ROA and NIM as the proxy of profitability, the paper concluded that BI rate has a significantly negative effect on ROA, but it did not show a statistically significant impact on NIM. Furthermore, based on the semi-partial correlation coefficients, BI rate is proved to have great influence in determining ROA ranks, while Operational Cost of Operational Income is of great importance in determining NIM of commercial banks in Indonesia.

Ekpung et al. (2015) also examined the effect of monetary policy on banking sector performance from 1970 to 2006. However, the study uses banks’ deposit liabilities to represent banks’ performance and indicates that monetary policy has a significant effect on banks’ deposit liabilities. In particular, deposit rate and minimum discount rate have a negative influence on banks’ deposit liabilities, whereas exchange rate has a positive and significant impact on this variable.

In an investigation, Hülsewig et al. (2009) used DSGE models to examine the function of banks in the transmission of the monetary policies through the expense channel. The findings of this study indicate that financial expenses were the significant factors in price changes. Moreover, the results showed that the depreciation in the loan market doesn’t have any

effect on the increase of monetary policies' shocks. The researchers concluded that the cost channel power, required for the transmission of the monetary policies by the slow rates, was decreasing in the central bank.

Chang et al (2010) examined the asymmetric effects of monetary policy and bank credits in Taiwan banking industry. They examined whether the distributive effect of monetary policy on bank credit would be different when monetary policy was asymmetric. They used panel data for Taiwanese commercial banks and used the generalized Arlano & Bond (1991) moment method for their experimental analysis. First of all, they examined whether the distributive effects of monetary policy on bank lending behavior are related to bank balance sheet characteristics, such as asset size and liquidity strength, and whether these monetary policies are asymmetric. The results of their study showed that the money transfer bank lending channel is active in Taiwan and the extent of the effect of asymmetric policy depends on the characteristics of the bank's balance sheet.

Li and Wang (2012 examined the relationship between capital regulation, monetary policy, and the asymmetric effects of commercial bank performance. First, the paper made a static profit model of commercial banks with double constraints and then makes a proposition with numeric simulation. They found it unreasonable to calculate the commercial banks' cost and profit efficiency by SFA (DEA) directly, as there was no evidence that indicates the linearity relationship among them.

Abdi et al (2020) in an investigation of the asymmetric effects of economic variables on the performance of banks based on a comprehensive banking model, case study: Bank Melli Iran with Markov Regime Switching models and annually data from 200 to 2015 examined. The findings of this study indicate that the variables of interest rate of participation bonds, industry concentration index, cost-to-income ratio, ratio of overdue loans to total loans, equity to total assets, have a negative and significant impact on bank Melli Iran, and variables of loan-to-total ratio of assets, total assets, deposits customers' total debts, income diversification, inflation rate,

economic growth rate have had a positive and significant effect on Bank Melli. In addition, the variance of the variables in regime one, the fluctuation regime, is slightly less than in regime two.

Zangane et al (2021) in research examined analysis of the asymmetric impact of macroeconomic factors on banking facilities to the private sector during the boom and credit crisis. They used Markov switching models and quarterly data in the period of 2000 to 2020. The results of their study showed that the growth of banking facilities during the boom period increases with increasing economic growth, while during the recession has no effect on economic growth. Also, during the recession, inflation rate has a negative impact and the growth rate of bank deposits and interest rates on facilities have a positive impact on the growth of bank facilities.

3. Data and Methodology

The study examines the asymmetric effect of monetary policy on banks deposit in Iraq and the study employs monthly data for the period of Jan, 2005 to Jan, 2019. The research adopted official sources and the data were collected from Central Bank of Iraq (CBI). The monetary policy indicators used in the study are; Policy interest rate (IR); cash reserve requirement (RR); broad money supply (M2). While for measuring banks performance we use (Private sector deposit with commercial banks (BD). Moreover, the study uses several control variable; inflation (INF); stock return market (SR); a dummy variable (DU) for the period of ISIS (the Islamic state of Iraq and Syria) crisis in Iraq is considered. It began on June 2014 until December 2017 with the arrival of ISIS and its allies in northern Iraq to examine the asymmetric effect of monetary policy on banks deposit, the study used Shin et al. (2014) NARDL approach. This model allows us to assess the non-linearity and the asymmetric responses of banks deposit to monetary policy. The basic econometric model is given as follow:

$$BD_t = \beta 0 + \beta 1\ MP_t + \beta 2 Inf_t + \beta 3\ SR_t + DU + \mu \quad (1)$$

This technique allows us to collect inferences irrespective of the variables' integration orders. The method decomposes monetary policy in to its positive and negative:

$$\mathrm{MP}^{+} = \sum_{i=1}^{t} \Delta \mathrm{MP}_{i}^{+} = \sum_{i=1}^{t} \mathrm{Max}\,(\Delta \mathrm{MP}i, 0) \tag{2}$$

$$\mathrm{MP}^{-} = \sum_{i=1}^{t} \Delta \mathrm{MP}_{i}^{-} = \sum_{i=1}^{t} \mathrm{Min}\,(\Delta \mathrm{MP}i, 0) \tag{3}$$

The asymmetric long-run relationship without a constant term can be represented as:

$$BD_t = B_1^{+}\,\mathrm{MP}_t^{+} + B_1^{-}\mathrm{MP}_t^{-} + B_2 Inf_t + B_3 SR_t + u_t \tag{4}$$

Where, banks deposit (BD_t) and MP are scalar I(1) variables. Granger and Yoon (2002) extend the model, where cointegration may exist for their positive and negative components. Schorderet (2003) generates the above specification for asymmetric cointegration such that there may be a stationary variableZ_t, which may be written as:

$$Z_t = B_0 BD_t + B_1^{+}\mathrm{MP}_t^{+} + B_1^{-}\mathrm{MP}_t^{-} + B_2 Inf_t + B_3 SR_t \tag{5}$$

Where $BD_t$and $MP_t$are asymptotically cointegrated. If B_1^{+}=B_1^{-}, then the system reduces to (symmetric) cointegration. Following Shin et al. (2014), we extend the Linear ECM to a general NARDL-ECM as follows:

$$\Delta BD_t = \propto_0 + \rho \mathrm{BD}_{t-1} + \theta^{+}\mathrm{MP}_{t-1}^{+} + \theta^{-}\mathrm{MP}_{t-1}^{-} \sum_{j=1}^{p-1} y_{j\,\Delta BP_{t-j}} + \sum_{j=0}^{q-1}(\varphi_j^{+}\,\Delta \mathrm{MP}_{t-j}^{+} + \varphi_j^{-}\Delta \mathrm{MP}_{t-j}^{-}) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta Inf_t) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta SR_t) + DU + \varepsilon t \tag{6}$$

$$\Delta BD_t = \propto_0 + \rho\zeta_{t-1} + \sum_{j=1}^{p-1} y_{j\,\Delta BD_{t-j}} + \sum_{j=0}^{q-1}(\varphi_j^{+}\,\Delta \mathrm{MP}_{t-j}^{+} + \varphi_j^{-}\Delta \mathrm{MP}_{t-j}^{-}) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta Inf_t) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta SR_t) + DU + \varepsilon t \tag{7}$$

Where $\zeta_{t-1} = \beta D_t - \beta^{-}\mathrm{MP}_t^{-};\ \beta^{+} = -\theta^{+}/\rho : and \beta^{-} = -\theta^{-}/\rho$

This is the basic model that this study will be estimating for the main inference of this study (adapted from Sahin and Berument (2019)). The lag orders (p and q) are determined by following the general-to-specific approach, within the stepwise regression method internally, where the non-significant coefficients are dropped. To test for the existence of an asymmetric long-run relationship (cointegration), this study benefit from the model based on the NARDL-ECM approach described above and in this study, the study employs the NARDL-ECM methodology rather than a value at risk (VAR) methodology, using impulse response functions gathered from VAR for inferences requires the assumption that shocks to monetary policy rate capture monetary policy stance.

One of the aims of this study is to analyze how increases and decreases in monetary policy indicators affect banks performance and its sub-components. In order to capture that effect, this study calculates the dynamic asymmetric (or nonlinear) multipliers (see, Delatte and Lopez- Villavicencio 2012; Shin et al., 2014 and Van Hoang et al., 2016 for the details of the methodology). The multipliers are basically captured by:

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial BD_{t+j}}{\partial \mathrm{MP}_t^+} \; and \; m_h^- = \sum_{j=0}^{h} \frac{\partial BD_{t+j}}{\partial \mathrm{MP}_t^-}, \text{ Where h= 0, 1, 2, 3} \qquad (8)$$

The multipliers given in equation (8) converge to the long-run coefficients calculated by $-\theta^+/\rho : and \beta^- = -\theta^-/\rho$.

4. Results of the study

4-1. Unit root tests

Stationary tests can be used to determine whether a set of variables are stationary or not. The study employed (i.e., ADF and KPSS) tests to determine whether trending data should be first differenced or regressed on deterministic functions of time to make the data stationary. This is because if the variables have order integration of 2 or more; the amount of observed F statistics presented by Pesaran et al. (2001) for examining the long-term

relationship will not be reliable (Ang, 2007). Table 1 indicates the results of ADF and KPSS tests. According to the table the variable of Stock Return (SR) was stationary at level and the other variables became stationary after taking the first difference. That is, the variables are cointegrated of order I(1) and none of the variables are cointegrated of order I(2). Hence, the results of regression are reliable. Since the investigated variables are a combination of order I(0) and I(1), the use of NARDL approach could very useful.

Table 1. Unit root tests

Variables	ADF		KPSS		Stationary or non-stationary
	constant	Constant & trend	constant	Constant & trend	
BD	-4.01***	-2.09	1.46	0.40	non-stationary
IR_POS	-2.67*	-2.47	0.46*	0.18*	non-stationary
IR_NEG	-2.31	-1.06	1.21	0.31	non-stationary
RR_POS	-3.74***	-2.85	0.87	0.17*	non-stationary
RR_NEG	-1.39	-1.64	1.60	0.31	non-stationary
M2_POS	-2.51	-3.43**	1.72	0.26	non-stationary
M2_NEG	-1.16	-4.54***	1.71	0.22	non-stationary
SR	-13.84***	-13.80***	0.05***	0.05***	Stationary
Inf	-1.56	-1.80	0.90	0.23	non-stationary
DBD	-13.02***	-13.72***	0.31***	0.10***	Stationary
DIR_POS	-13.49***	-14.20***	0.37**	0.12**	Stationary
DIR_NEG	-6.76***	-10.77***	0.37**	0.08***	Stationary
DRR_POS	-12.89	-13.41***	0.09***	0.08***	Stationary
DRR_NEG	-14.03***	-14.07***	0.18***	0.05***	Stationary
DM2_POS	-5.27***	-5.58***	0.14***	0.03***	Stationary
DM2_NEG	-14.15***	-14.51***	0.16***	0.05***	Stationary
DInf	-3.83***	-4.68***	0.20***	0.10***	Stationary

Notice: (i) c; denote most general model with a constant and without linear trend. (ii) ct; is the model with a constant and linear trend. (iii) D: represents the first difference. ***denotes significant level at 1%, **denotes significant level at 5%, *denotes significant level at 10%.
Source: research findings

4-2. Effect of Asymmetric Monetary Policy on Bank Deposit

In this section, the impact of asymmetric monetary policies on bank deposit is discussed. First, the optimized state of NARDL is estimated after examining unit root tests. Then, the existence or non-existence of a long-term relationship between the variables of the study, Unrestricted Error Correction Model (UECM) is presented as follows:

$$\begin{aligned}\Delta BD_t = \propto_0 + \ \rho \mathrm{BD}_{t-1} + \ \theta^{+}\mathrm{MP}_{t-1}^{+} \\ + \ \theta^{-}\mathrm{MP}_{t-1}^{-} \sum_{j=1}^{p-1} y_{j\,\Delta BD_{t-j}} + \sum_{j=0}^{q-1}(\varphi_j^{+}\,\Delta \mathrm{MP}_{t-j}^{+} \\ + \varphi_j^{-}\Delta \mathrm{MP}_{t-j}^{-}) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta Inf_t) + \sum_{j=0}^{q-1}(\varphi_j\,\Delta SR_t) \\ + DU + \ \varepsilon_t\end{aligned} \tag{9}$$

It is worth mentioning that BD indicates banks deposits, MP indicates the Monetary Policies and, in this study, three significant variables (i.e., Central Bank Interest Rate (IR), Reserve Requirement (RR), and Broad Money Supply (M2)) are used for monetary policies. In the above equation, θ^{+} و $\theta^{-}$are long-term coefficients, φ^{+} و $\varphi^{-}$are short-term coefficients, $\propto_0$ indicates intercept, ρ represents autoregression, ،ε_t is residual, Δ shows difference operator, p and q are the optimal time-lags determined/described by Akaike information criterion (AIC), Final Prediction Error (FPE) and Log Ratio (LR). The different forms of NARDL approach were discussed for the above equation. Table 2 illustrates the optimized results estimated.

Table 2. NARDL results (Dependent variable: BD)

Variables	Coefficient	Std. Error	T-statistic	Prob
BD(-1)	0.863743	0.026987	32.00641	0.0000
IR_NEG	0.012500	0.008799	1.420573	0.1577
IR_NEG(-1)	0.003012	0.011490	0.262099	0.7936
IR_NEG(-2)	-0.020383	0.010083	-2.021554	0.0451
IR_NEG(-3)	0.014885	0.006810	2.185799	0.0305
IR_POS	0.008896	0.006750	1.318043	0.1896
IR_POS(-1)	-0.008185	0.007555	-1.083464	0.2805
IR_POS(-2)	0.006343	0.007292	0.869892	0.3858
IR_POS(-3)	-0.014568	0.007103	-2.050967	0.0421
IR_POS(-4)	-0.022104	0.007223	-3.060128	0.0027
IR_POS(-5)	0.028939	0.006022	4.805271	0.0000
RR_NEG	-0.133946	0.042824	-3.127794	0.0021
RR_NEG(-1)	0.067740	0.043426	1.559898	0.1210
RR_POS	-0.001887	0.047418	-0.039789	0.9683
RR_POS(-1)	-0.045908	0.063510	-0.722855	0.4710
RR_POS(-2)	0.105939	0.063432	1.670132	0.0971
RR_POS(-3)	-0.034670	0.058182	-0.595892	0.5522
RR_POS(-4)	-0.051417	0.057582	-0.892935	0.3734
RR_POS(-5)	0.166234	0.043789	3.796258	0.0002
M2_NEG	0.004810	0.003593	1.338656	0.1829
M2_POS	-0.028694	0.019672	-1.458626	0.1469
M2_POS(-1)	0.025512	0.027593	0.924605	0.3568
M2_POS(-2)	0.029336	0.029229	1.003657	0.3173
M2_POS(-3)	0.007360	0.029311	0.251102	0.8021
M2_POS(-4)	-0.043083	0.018923	-2.276808	0.0243
INF	0.000258	0.000704	0.366668	0.7144
INF(-1)	0.002596	0.000870	2.983223	0.0034
INF(-2)	-0.001353	0.000824	-1.642178	0.1028
INF(-3)	0.001831	0.000847	2.161951	0.0323
INF(-4)	-0.001525	0.000756	-2.015931	0.0457
INF(-5)	-0.001607	0.000661	-2.430526	0.0163
SR	-9.43E-05	0.000113	-0.830750	0.4075
DU	0.020626	0.008235	2.504601	0.0134
C	2.199788	0.429444	5.122413	0.0000

Source: Research Results

The estimation results of NARDL showed that the maximum optimized lag for the variables is five based on AIC. The positive shock of the interest rate has a positive impact on BD. It showed a positive effect on BD in the second and fifth lags, however, it has a negative impact on BD in the first, third and fourth optimized lags. On the other hand, the negative shock of the interest rate has a negative and meaningful impact on BD in the second lag, however, in the third lag, this rate shows a direct and meaningful effect on BD at the error level of 5 percent. Therefore, a rise in the interest rate leads to an increase in the BD in the Iraqi commercial banks and vice versa. Moreover, the positive shocks of reserve requirement (RR) show a direct, positive, and meaningful impact on BD only in the second and fifth lags, and the negative shock of RR has a negative impact on BD. The results are not consistent with economic literature as it is stated when there is a rise in RR the money supply decrease and thus the BD must decrease and vice versa. For the case of Iraq may be due to the rise of deposits is not consistent with credit volume as there were idle funds due to the excess of liquidity in Iraqi commercial banks and the reserve ratios affects the credit activity. Thus, the availability of high liquidity in the banks makes this tool ineffective. The positive shocks of money supply showed a negative and meaningful effect on BD at the error level of 5 percent; however, its negative shocks did not indicate any significant impacts on BD, keeping money depends on the trade-off between the advantages of liquidity and the costs of holding money and the investment opportunity cost. As mentioned before The Iraqi banks have the excess of liquidity due to the lack of investment opportunity, thus negative shocks may not have significant impact. According to the realities in economics, the inflation rate generally increases BD, and the stock return did not effect on BD, and the dummy variable has a positive impact on BD The results are not consistent with economic literature, this may be because the major parts of Iraq were safe and far from the ISIS war and the Iraqi commercial banks were active in the north and south of the country.

The cointegration test of Pesaran et al. (2001) were used to investigate the long-term relationship between the variables of the model. In this approach, two critical bounds with significant levels have been considered, where the upper bound is for the time series at I(1) and the lower bound is for the time series at I(0). If the obtained F value is above the upper bound I(1), the null hypothesis (i.e., there is no cointegration) is rejected; by the same token, if the F value is below the lower bound I(0), the null hypothesis cannot rejected. However, if the F value doesn't include in this boundary, the logical conclusion could not be drawn unless the cointegration order of variables is known (Pesaran et al., 2001). The Bound test is used to detect the existence or non-existence of any long-term asymmetrical relationship between the variables of the model. Table 3, shows the results of the Bound test. As shown in the table, the obtained F value is larger than the upper bound value at all levels. From this perspective, the findings confirm a balance long-term relationship between the asymmetrical variables at all levels.

Table 3. F-Bound test (Dependent variable: BD)

F-statistic value	**4.81**	
Signif.	I(0)	I(1)
10%	1.88	2.99
5%	2.14	3.3
2.5%	2.37	3.6
1%	2.65	3.97

Source: Research Results

After specifying the long-term relationship between the variables of the model, we examine the long-term coefficients of the model presented in Table 4.

Table 4. Long-run estimation result (Dependent variable: BD)

Variables	Coefficient	Std. Error	T-statistic	Prob
IR_NEG	0.073487	0.034657	2.120418	0.0357
IR_POS	-0.004980	0.018969	-0.262528	0.7933
RR_NEG	-0.485892	0.197244	-2.463411	0.0150
RR_POS	1.014931	0.169310	5.994496	0.0000
M2_NEG	0.035303	0.026096	1.352836	0.1783
M2_POS	-0.070227	0.030952	-2.268905	0.0248
INF	0.001466	0.005476	0.267749	0.7893
SR	-0.000692	0.000855	-0.809178	0.4198
DU	0.151374	0.055026	2.750939	0.0067

Source: Research Results

As shown in Table 4, the negative shocks of policy interest rate increase BD and the negative shock do not have significant effect on BD in long-run. Moreover, the positive shocks of RR have a positive effect, but the negative shocks of RR have an inverse effect on the BD trend in Iraq this may be due the contradiction in the case of the banking system in Iraq suffering from the excess of liquidity corresponding to a lack of proper use of funds and investment. Moreover, the results show that although the inflation could impact on BD in the short-term, this effect will not be significant in long-run and Dummy variable has positive effect on BD in the long-run. After estimation of coefficients in the long-term, the ECM (Error Correction Model) is examined. Actually, this test correlates the changes in the short-term model to its long-term values. Table 5 shows the results of short-run coefficient estimation. The results show that the error correction coefficient is negative and less than -1; statistically, this coefficient is meaningful indicating a long-term relationship between the variables of the model. ECM coefficient model is negative and this shows that the current imbalance in the short term will be balanced in the long-term. This coefficient shows the speed of adjustment and the coefficient equals -0.13 showing that 13 percent of the error model is corrected in the short-term and the short-term model converges to the long-term. Furthermore, as shown in table 5, the effect of

variables on the BD in short term is the same as the long-term results and there is only a slight difference in the coefficients.

Table 5. Short-run results (Dependent variable: BD)

Variables	Coefficient	Std.Error	T-statistic	Prob
C	2.199788	0.307491	7.153991	0.0000
D(IR_NEG)	0.012500	0.007996	1.563214	0.1203
D(IR_NEG(-1))	0.005498	0.006477	0.848870	0.3974
D(IR_NEG(-2))	-0.014885	0.006390	-2.329363	0.0213
D(IR_POS)	0.008896	0.005257	1.692327	0.0928
D(IR_POS(-1))	0.001390	0.004958	0.280273	0.7797
D(IR_POS(-2))	0.007733	0.004956	1.560287	0.1209
D(IR_POS(-3))	-0.006835	0.005020	-1.361570	0.1755
D(IR_POS(-4))	-0.028939	0.005378	-5.381493	0.0000
D(RR_NEG)	-0.133946	0.038877	-3.445371	0.0008
D(RR_POS)	-0.001887	0.042205	-0.044703	0.9644
D(RR_POS(-1))	-0.186086	0.048191	-3.861390	0.0002
D(RR_POS(-2))	-0.080147	0.047583	-1.684366	0.0943
D(RR_POS(-3))	-0.114817	0.045315	-2.533737	0.0124
D(RR_POS(-4))	-0.166234	0.041386	-4.016680	0.0001
D(M2_POS)	-0.028694	0.016691	-1.719100	0.0878
D(M2_POS(-1))	0.006387	0.017716	0.360533	0.7190
D(M2_POS(-2))	0.035723	0.018108	1.972759	0.0505
D(M2_POS(-3))	0.043083	0.017781	2.422967	0.0167
D(INF)	0.000258	0.000594	0.434531	0.6646
D(INF(-1))	0.002654	0.000621	4.270751	0.0000
D(INF(-2))	0.001301	0.000652	1.995601	0.0479
D(INF(-3))	0.003132	0.000637	4.919880	0.0000
D(INF(-4))	0.001607	0.000544	2.957084	0.0036
CointEq(-1)	-0.136257	0.019039	-7.156739	0.0000

Source: Research Results

In this study, the Wald test is used to examine the symmetrical and asymmetrical effects of monetary policies' negative and positive shocks on BD as well as be certain concerning the use of the selected non-linear model.

The results of this test are presented in Table 6. Accordingly, the results indicated that the obtained values are lower than the probability value (0.05), therefore, the null hypothesis (i.e., the shocks are symmetrical) is rejected for IR and RR variables but, for M2 is accepted. This indicates that the positive and negative shocks of independent variables (IR and RR) do not have similar effects on the dependent variables. In simple words, the negative and positive shocks of IR and RR have an asymmetrical impact on the BD variable meanwhile M2 has symmetric effect on the BD.

Table 6. Asymmetric test results (Dependent variable: BD)

Variables	F-Statistics	Prob
IR	5.286683	0.0230
RR	22.42574	0.0000
M2	0.046063	0.8304

Source: Research Results

Moreover, to test the nonlinearity of the long-run model for the BD dependent variable, its null hypothesis is:

$$H_0 = \frac{\beta^+}{\rho} = \frac{\beta^-}{\rho} \tag{10}$$

That is, the negative and positive shocks are divided into dependent variable coefficient (ρ) that if this hypothesis is rejected it can be claimed that there is an asymmetrical long-term relationship that Table 7 represents the results of its. According to this table, the values of T, F, and Chi-square are significant at 5 percent level, and therefore, the null hypothesis is rejected and it depicts that there is an asymmetrical long-term relationship between the shocks of monetary policies and BD in Iraq. The result is consistent with the finding of Gambacorta & Iannotti (2007) when they revealed monetary policy in response to positive and negative shocks is asymmetrical, in that banks adjust their loan (deposit) rate faster during periods of monetary tightening. Drechsler et al. (2017) claimed that the transmission of monetary policy should be understood from the liability side

of banks' balance sheets. In particular, they argued that there is a 'deposits channel' through which increases in the policy rate widen deposit rate expansion, leading to deposit outflows that reduce banks' lending capacity.

Table 7. Wald test (Dependent variable: BD)

Statistics	Value	Prob
T	-4.377831	0.0000
F	19.16541	0.0000
χ^2	19.16541	0.0000

Source: Research Results

Generally, diagnostic tests are used to check the correctness of the model estimated. The results of these tests are represented in Table 8.

Table 8. Results of Diagnostic tests for a Suitable Model (Dependent variable: BD)

R^2	F-statistic	Prob (F)	D.W	ARCH-test	LM-test
0.99	1826	0.0000	2.07	2.92 (0.08)	0.27 (0.60)

Digits in the parenthesis indicate the probability value of the tests

Source: Research Results

According to Table 8, the coefficient of determination shows that the independent variables have been able to describe the dependent variable almost in average 99 percent. F value represents the meaningfulness of the estimated regression and based on the probability value; our estimated regression is meaningful. Moreover, the value of D.W. is around 2 and the amount of LM-test equals 0.27, and since the probability of this value is more than 0.05, hence, we retain the null hypothesis and accept that there is no autocorrelation. The value for the statistic of heteroskedasticity test (ARCH-test) amounts to 2.92 and since the probability of this statistic is greater than 0.05, then, we accept the null hypothesis that there is no heteroscedasticity.

CUSUM and CUSUMQ tests, which have a long history in econometric literature, are used to examine the stability coefficients in the model. In these tests, the null hypothesis tests the stability of the parameters at a significance level of 5 percent. In these two tests, the confidence interval is two straight lines that show a 95 percent confidence level. If the test statistics diagrams are placed between these two lines, the null hypothesis of coefficient stability cannot be rejected. Figures 1 show that the statistics are within the percent confidence level, which means that the coefficients of the estimated model are stable.

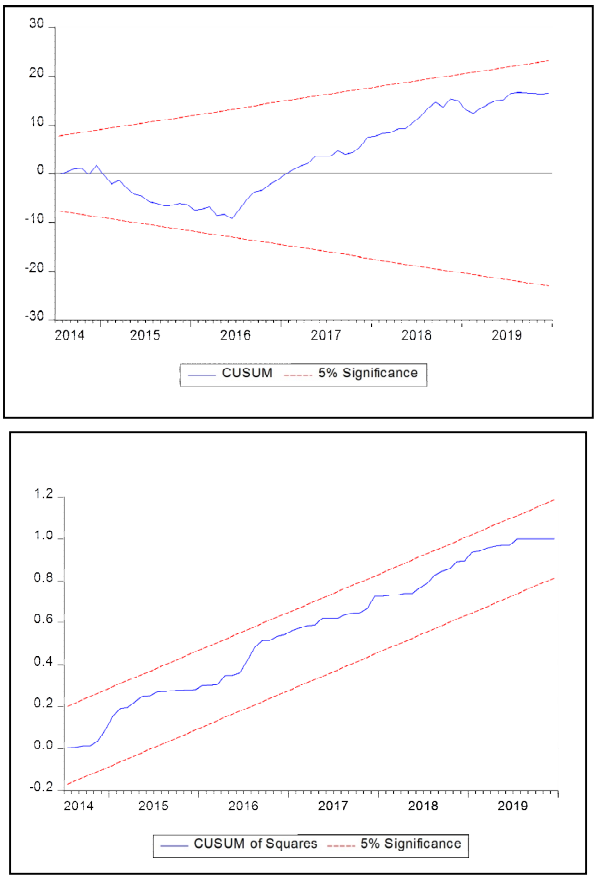

Figure 1. CUSUM and CUSUMQ test for dependent variable model: BD

Source: research results

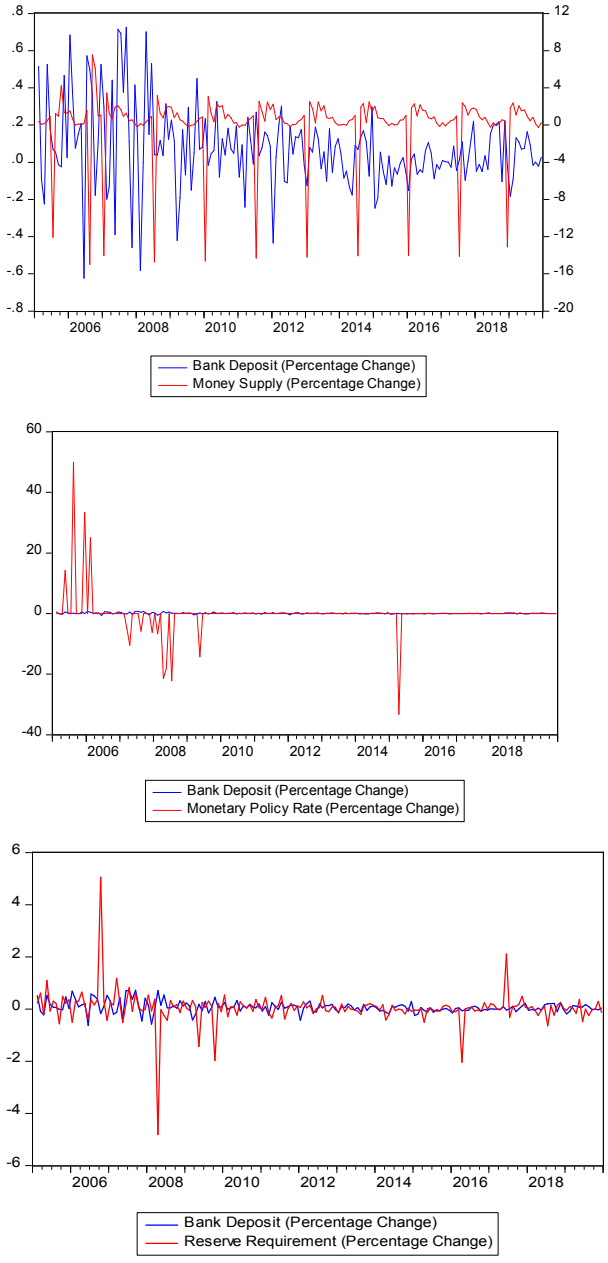

Figure 2. Correlation graph between bank deposit and monetary policy indicator, Source: research results

5. Conclusion

The main purpose of this study was to examine the asymmetric effects of monetary policy on the commercial banks' deposit in Iraq. Using monthly data from Jan 2005 to Dec 2019 To achieve this goal, first, the stationary condition of the variables was investigated and the results indicated that the variables were I(0) and I(1). Then, the NARDL approach was used and the findings confirm the non-linear relation between monetary policy and banks deposits as suggested by the literature. Bound test results shows the long term asymmetric effect of monetary policy on banks deposit, Furthermore the Wald test is used to examine the symmetrical and asymmetrical effects of monetary policies' negative and positive shocks on BD. therefore, the null hypothesis (i.e., the shocks are symmetrical) is rejected for IR and RR variables but, for M2 is accepted. This indicates that the positive and negative shocks of independent variables (IR and RR) do not have similar effects on the dependent variables. In simple words, the negative and positive shocks of IR and RR have an asymmetrical impact on the BD variable meanwhile M2 has symmetric effect on the BD. the monetary policymakers, particularly the central bank of Iraq, need to seriously control the bank behaviors and the asymmetric effects of the variables. Hence, it is recommended that the officials pay specific attention to the economic and political conditions to maintain the economic stability.

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