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Deposit Interest Rate, Aggregate Savings and Monetary Policy Rate in Nigeria: A Structural Change Analysis

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Abstract

The relationship between deposit interest rate and savings is a crucial monetary policy issue in Nigeria. Moreover, the Central Bank of Nigeria introduced the monetary policy rate (MPR) in the country in 2006 to serve as the anchor rate for market interest rates, such as deposit interest rate. Therefore, the objective of this paper is two-fold: (i) To investigate whether there was a structural change in the relationship between deposit interest rate and aggregate savings in Nigeria in 2006, due to the introduction of the MPR. (ii) To assess the short-run and long-run impacts of the structural change. To achieve the objective the study employed the Chow test and the dummy-based structural change technique within the framework of the autoregressive distributed lag (ARDL) cointegration model, based on time series data spanning 1981 to 2021. The results showed that the introduction of the MPR caused a structural change in the relationship between Nigeria's deposit interest rate and aggregate savings in 2006. However, the dummy-based ARDL technique gave further information by showing that the structural change only occurred in the short-run. The policy implications of the findings is that monetary policy measures need to be tailored towards making deposit interest rate to increase aggregate savings via the MPR channel in the long-run as well.

Keywords: Monetary policy rate, savings behaviour, monetary policy rate, structural break, Nigeria
JEL Classification: E2, E4, E5

1. Introduction

The level of domestic savings is a crucial factor of economic performance in developing countries such as Nigeria, due to the savings-investment-growth nexus. An increase in the level of savings induces a higher level of investment, which in turn leads to a higher level of economic growth. As shown in economic growth theories, particularly the neoclassical Solow growth model which is considered to be the baseline model of economic growth, low level of savings in developing countries is a major factor causing the growth differences between them and their developed counterparts (Solow, 1956; Romer, 2012; Barış, 2020; Ribaj and Mexhuani, 2021). The investment induced by savings can help Nigeria as a developing country in different ways, which include the following: Investment boosts aggregate demand and the performance of the demand side of the economy; an increase in investment has a multiplier effect in the economy; and investment in training and education of workers increases the productivity of labour and the performance of the supply side of the economy.

Although foreign direct investments from big countries such as China and U.S. have benefitted developing countries such as Nigeria (Fu, Buckley and Fu, 2020; Yanzhuo, 2014), domestically generated investment still needs to be stimulated in these countries through savings. In this line, several policies on interest rates, particularly the deposit interest rates, have been introduced in Nigeria to stimulate savings and achieve related objectives.

However, there is the possibility of the abrupt change, called structural break, in the relationship between savings and deposit interest rate in Nigeria, due to the introduction of the monetary authority's policy rate called the monetary policy rate (MPR) in 2006 by the Central Bank of Nigeria (CBN). Statistically, such a break, which can also be described as a change point, induces changes in regression parameters.

The monetary policy committee of the CBN determines the MPR in line with the policy objectives of the Bank. Since the MPR is the CBN's policy rate, changes in its value feed into other interest rates (e.g. deposit interest rate) and influence the direction of changes in the other rates. This process makes the MPR to serve as the anchor rate for other interest rates. Therefore, the introduction of the MPR is a potential source of structural change in the relationship between deposit interest rate and savings in Nigeria. Furthermore, the findings of studies on the relationship between deposit interest rate and savings in Nigeria are inconclusive. While some studies (e.g. Udude, 2015) show that an increase in deposit interest rate increases savings in Nigeria, other studies (e.g. Babalola and Abdul, 2022) show that an increase deposit interest rate does not increase savings in the country. The inconclusive findings and debate on the relationship between deposit interest rate and savings in Nigeria necessitate further studies.

In line with the foregoing background, the objective of this paper is two-fold: (i) To investigate whether there is a structural change in the relationship between deposit interest rate and aggregate savings in Nigeria, due to the introduction of the MPR in 2006. (ii) To assess the short-run and long-run impacts of the structural change. The paper proceeds as follows: A review of related literature is done in section two; data and methodology are discussed in section three; results are presented and discussed in section four; while concluding remarks are made in section five.

2. Literature Review

2.1. Theoretical Review

At the theoretical side of the literature, the McKinnon-Shaw hypothesis, attributed to McKinnon (1973) and Shaw (1973), postulates that liberalizing the financial sector raises the interest rate and consequently leads to increased saving and investment rates, leading eventually to increased economic growth. Therefore, among other things, the hypothesis shows that causality runs from interest rate to aggregate savings in the economy. That is, the hypothesis shows that in a liberalized financial sector, increasing the interest rate, such as the deposit interest rate, motivates economic agents to save. The hypothesis is not in support of financial repression measures, such as interest rate ceilings that involve keeping interest rates low and below their market-clearing values. Such ceilings hinder the market from reaching its equilibrium, leading to market distortions (Jafarov *et al*., 2019). Besides, low interest rates discourage savings and lead to withdrawal of funds from banks, leading to reduced credit, investment and growth in the economy (Osei-Assibey and Baah-Boateng, 2012; Eschenbach, 2004).

There are two key points that summarize the foregoing discussion on the McKinnon-Shaw hypothesis. The first point is that financial repression, which points to legal constraints on interest rates and financial operations such as credit allocation, is inimical to the financial sector and the economy as a whole. The second point is that the relationship between interest rate and savings is of paramount importance when the financial sector is liberalized, because savings are usually impacted first by changes in interest rate before other variables such as investment and growth are impacted. For example, changes in deposit interest rate induced by policies on interest rate will induce changes on aggregate savings. Such policy-induced changes in the relationship between deposit interest rate and

aggregate savings point to possible existence of structural breaks in the relationship.

While the McKinnon-Shaw hypothesis is an economic view that supports financial liberalization, other economic views on the financial sector exist in the literature. The connection among all the views reveals the evolution of thoughts on the financial sector and promotes the understanding of the view of interest, namely the financial-liberalization view.

2.2. Empirical Review

At the empirical side of the literature, there is evidence that liberalization of the financial sector and interest rates, which the McKinnon-Shaw hypothesis advocates, usually has a positive impact on macroeconomic performance. Jafarov *et al*. (2019) empirically compares economic performance under regimes of liberalized and controlled interest rates for several countries and find that liberalization leads to better economic performance. As the authors show, liberalization of interest rates leads to lower inflation rate, higher growth and higher likelihood of exiting a recession, relative to tightening of interest rates. This means that interest rates tend to impact the real and financial sectors positively when the rates are liberalized.

In this line, both deposit and leading interest rates tend to impact on savings positively in a developing country. Udude (2015) examines the impact of deposit interest rate on savings in Nigeria using the vector autoregressive (VAR) model and finds that increased deposit interest rate leads to increased propensity to save in the country. In a developing country like Nigeria, most of the depositors of deposit banks are low-income economic agents (i.e. individuals and small firms), hence increased returns on deposits arising from increased deposit interest rate motivate depositors to increase savings.

Ojeaga et al. (2013) show that lending interest rate also impacts positively on savings in Nigeria. Controlling for factors that influence the confidence of the customers of commercial banks, the authors examine the effects of lending interest rate on savings behaviour in Nigeria, using the quantile regression technique. The authors find that the level of savings increases as lending interest rate increases in the country. The factors that influence customers' confidence in commercial banks considered by the authors are factors that affect the motivation of customers to undertake banking activities, such as customers' wage rates, losses of commercial banks and quality of institutions. Basically, the principle of money creation by commercial banks shows that after the banks keep stipulated reserves in line with the cash reserve ratio, they lend to customers who in turn deposit part of the loans they borrow, hence lending interest rate could influence the deposits (i.e. savings) of customers within the banks through the money-creation process.

However, the impacts of deposit and leading interest rates may be contrary to each other sometimes in a developing country. Osei-Assibey and Baah-Boateng (2012) tests the McKinnon-Shaw hypothesis for Ghana and finds that the hypothesis does not hold for Ghana, because of the contradictory impacts of deposit and leading interest rates. According to the authors, while deposit interest rate impacts positively on savings, leading interest rate impacts negatively on investment, making the net impact of deposit interest rate to be negative.

The impacts of retail interest rates, such as deposit and lending interest rates, on variables in the real and financial sectors of the economy usually originate from changes in the monetary authority's policy rate through pass-through from the policy rate to the retail rates. The degree and speed of pass-through in a country are largely influenced by macroeconomic, financial and institutional factors (Greǵor *et al*., 2019). Hence, the degree and speed of pass-through in developed countries are usually different from those of developing countries. Mordi *et al*. (2019) examine pass-through from MPR to several retail

rates in Nigeria, using an error-correction model that accounts for structural breaks. The authors find that pass-through is weak and incomplete. This affects the way the retail rates impact on variables such as savings and investment.

3. Methodology

3.1. Data Sources and Measurement of Variables

The data employed for the study were sourced from the World Development Indicators. However, the dummy variable used in the study was constructed by the author. Table 1 presents information on the data of the study. The information covers names of variables, units of measurement of variables, periods of data coverage and data sources.

Table 1: The Data of the Study

Variable Name	Unit of Measurement	Period of Data Coverage	Data Source
Gross savings	Millions of Naira	1981 to 2021	World Development Indicators
Deposit interest rate	Percentage	1981 to 2021	World Development Indicators
Exchange rate	Naira per U.S. dollar	1981 to 2021	World Development Indicators
CPI Inflation	Percentage	1981 to 2021	World Development Indicators
Monetary policy rate (MPR)		1981 to 2021	Dummy constructed by author

Note: The dummy takes value 1 from 2006, the year the MPR was introduced in Nigeria, and zero otherwise.

Source: Author's Compilation (2024)

3.2. Data Analysis Techniques

3.2.1. Unit Root Tests

The analysis starts with unit root tests undertaken to determine the stationarity properties of the variables under consideration. Thereafter, Chow test and the ARDL model are employed for the structural change analysis. Variables are modelled for the Chow test and in the ARDL cointegration model in line with the results of the unit root tests.

3.2.2. Chow Test

The Chow test, attributed to Chow (1960), is a test for investigating whether a structural change exists in a known date, based on statistics such as F and Wald statistics The Chow test involves testing whether regression parameters change or are equal across time periods, such as before and after the introduction of a policy. The test can also be employed to test whether regression parameters change or are equal across groups, such as male and female groups.

3.2.3. ARDL Cointegration Model: Dummy-Based Structural Change Technique within the Framework of the Model

The dummy-based structural change technique within framework of the ARDL model involves including the MPR dummy in the ARDL cointegration model of Pesaran and Shin (1998) and Pesaran, Shin and Smith (2001), referred to as PSS hereafter. There are two key advantages of analyzing the structural change within the ARDL cointegration model: (i) The cointegration model makes it possible to examine the structural change in the short-run and long-run, which cannot be achieved with the Chow test. (ii) The cointegrationn model makes it possible to know whether the existence of a structural change is due to differences

in the intercepts or slopes of the regressions for the periods before and after the structural change, unlike the Chow test which only indicates whether a structural change exists or not.

Testing for cointegration based on the ARDL technique of PSS requires that unit root tests are first conducted to determine the stationarity properties of variables, in that the technique is only appropriate when considered variables have different orders of integration and none of the variables is integrated of order two. That is, each of the considered variables must be integrated of order zero [i.e. I (0)] or order 1 [i.e. I (1)].

The ARDL cointegration technique of PSS involves testing for cointegration based on the F-test by estimating an unrestricted error-correction model. The level-form and differenced form of the variables under consideration are included in the unrestricted error-correction model, as a standard error-correction model should have. However, the error-correcting term that imposes short-run and long-run dynamics is not included, hence the name unrestricted error-correction form. If cointegration is found to exist among the modelled variables within the unrestricted error-correction model, the cointegration equation and the error-correction model (with the error-correction term) will then be specified and estimated.

The specified cointegration equation shows the long-run relationship among the variables under consideration. On the other hand, the error-correction model shows the short-run relationship among the variables of interest. The error-correction model also shows through the error-correction term how equilibrium is restored in the long-run after disequilibrium occurs in the short-run. That is, the error-correction model shows through the error-correction term the connection between short-run and long-run dynamics.

Following PSS, the unrestricted error-correction model of the present paper is specified as follows:

$$\Delta lngrsv_t = \varphi + \alpha lnrgs_{t-1} + \beta dintr_{t-1} + \pi mpr_{t-1} + \gamma(mpr * dintr)_{t-1} + \kappa inf_{t-1} + \mu lexch_{t-1} + \tau(mpr * lexch)_{t-1} + \sum_{j=1}^{p-1} \omega_j \Delta lgrsv_{t-1} + \sum_{j=0}^{q-1} \delta_j \Delta dintr_{t-1} + \sum_{j=0}^{m-1} \eta_j \Delta(mpr)_{t-1} + \sum_{j=0}^{n-1} \nu_j \Delta(mpr * dintr)_{t-1} + \sum_{j=0}^{k-1} \varrho_j \Delta(inf)_{t-1} + \sum_{j=0}^{s-1} \varpi_j \Delta(lexch)_{t-1} + \sum_{j=0}^{z-1} \sigma_j \Delta(mpr * lexch)_{t-1} \varepsilon_t \quad (1)$$

where lngrsv is natural log of gross national savings; dintr is real deposit interest rate; mpr is the monetary policy dummy that takes value 1 from 2006 (the year the monetary policy rate was introduced) and zero otherwise; mpr*rdintr is the mpr dummy interacted multiplicatively with deposit interest rate; inf is CPI inflation; lnexch is natural log of exchange rate; mpr*lnexch is the mpr dummy interacted multiplicatively with natural log of exchange rate; ln stands for natural log; φ is the constant; $\alpha, \beta, \pi, \gamma, \kappa, \mu \; and \; \tau$ are long-run parameters, which are scalars; $\omega_j, \delta_j, \eta_j, \nu_j, \varrho_j, \varpi_j$ and σ_j are short-run parameters, which are vectors; Δ is the difference operator; while ε is the error term without serial correlation. Basically, information criteria, such as the Akaike information criterion, are employed to determine lag orders in the ARDL model. Cointegration test is conducted with equation (1), based on the hypothesis of no cointegration stated as follows:

H_0: $\alpha = \beta = \pi = \gamma = \kappa = \mu = \tau = 0$.

The long-run model that corresponds to the unrestricted error-correction model of equation (1) is specified as

$$lngrsv_t = \chi + \sum_{j=1}^{p-1} \xi_j lngrsv_{t-j} + \sum_{j=0}^{q-1} \varsigma_j dintr_{t-j} + \sum_{j=0}^{m-1} \Gamma_j mpr_{t-j} + \sum_{j=0}^{n-1} \upsilon_j (mpr * dintr)_{t-j} + \sum_{j=1}^{k-1} \psi_j inf_{t-j} + \sum_{j=0}^{s-1} \mathrm{Z}_j (lnexch)_{t-j} + \sum_{j=0}^{z-1} \mathrm{I}_j (mpr * lnexch)_{t-j} +$$

η_t (2)

where the variables are as defined for equation (1) and η is the serially uncorrelated error term.

The (restricted) error-correction model that corresponds to the unrestricted error-correction model of equation (1) is specified as

$$\Delta lngrsv_t = \tau + \sum_{j=1}^{p-1} \zeta_j \Delta lngrsv_{t-j} + \sum_{j=0}^{q-1} \kappa_j \Delta dintr_{t-j} + \sum_{j=0}^{m-1} \rho_j \Delta mpr_{t-j} + \sum_{j=0}^{n-1} \vartheta_j \, (mpr * dintr)_{t-j} + \sum_{j=0}^{k-1} \psi_j \, inf_{t-j} + \sum_{j=0}^{s-1} \pi_j \, lnexch_{t-j} + \sum_{j=0}^{z-1} \lambda_j \, (mpr * lnexch)_{t-j} + \phi ECM_{t-1} + z_t \quad (3)$$

where the variables are as defined for equation (1), z is the serially uncorrelated error-term, and ECM is the error-correction term.

4. Data Analysis and Discussion of Findings

4.1. Unit Root Tests

The unit root test techniques employed are the Augmented Dickey-Fuller and Phillips-Perron techniques. The two unit root techniques employed involve comparing computed test statistic with corresponding critical value in absolute terms, based on the null hypothesis that the variable under consideration has a unit root. If the computed test statistic is less than the critical value in absolute terms, the null hypothesis is accepted, which implies that the variable under consideration has a unit root. On the other hand, if the computed test statistic is greater than the critical value in absolute terms, the null hypothesis is rejected, implying that the variable under consideration does not have a unit root.

The results of the unit root tests are presented in Tables 2 and 3 below. The results cover the test statistics, critical values and interpretations for the level forms and first differences of the variables under consideration. The decisions on the orders of integration of the variables are based on comparisons of the test statistics and critical values in absolute terms. That is, the stationarity/non-stationarity status of the variables is determined based on their orders of integration.

Table 2: Dickey-Fuller Unit Root Tests Results

Level					First Differences			
Variable	Test Statistic	5% critical value	Decision	S/NS	Test Statistic	5% critical value	Decision	S/NS
Lngrsv	− 0.175374	− 2.936942	−	NS	− 6.922425	− 2.938987	I(1)	S
Dintr	− 1.437790	− 2.945842	−	NS	− 3.615027	− 2.945842	I(1)	S
Inf	− 3.009166	− 2.936942	I(0)	S	−	−	−	−
Lnexch	− 2.108911	− 2.936942	−	NS	− 5.374535	− 2.938987	I(1)	S

Note: S and NS point to "stationary" and "not stationary" respectively. Deposit interest rate (dintr) and inflation (inf) are not logged because there are measured in percentage.

Source: Author's Computation (2024)

Table 3: Phillips-Perron Unit Root Test Results

Level					First Differences			
Variable	Test Statistic	5% critical value	Decision	S/NS	Test Statistic	5% critical value	Decision	S/NS
Lngrsv	− 0.136703	− 2.936942	−	NS	− 6.900571	− 2.938987	I(1)	S
Dintr	− 2.484238	− 2.936942	−	NS	− 7.784715	− 2.938987	I(1)	S
Inf	− 3.169269	− 2.936942	I(0)	S	−	−	−	−
Lnexch	− 2.260242	− 2.936942	−	NS	− 5.374535	− 2.938987	I(1)	S

Note: S and NS point to "stationary" and not stationary" respectively. Deposit interest rate (dintr) and inflation (inf) are not logged because there are measured in percentage.

Source: Author's Computation (2024)

As shown in Tables 2 and 3, the test statistics of the log of gross savings (lngrsv), deposit interest rate (dintr) and the log of exchange rate (lnexch) are lower than their critical values in absolute terms at the 5% level of significance for the level forms of the variables. However, for the first differences of the variables, the test statistics are greater than their critical values in absolute terms at the 5% level of significance. This implies that the three variables are stationary after they are differenced once. On the other hand, the test statistic of inflation (inf) is higher than its critical value at the 5% level of significance at the level form. This implies that inflation is stationary at the level form.

4.2. Chow Test

The Chow test is employed in this paper to test for the existence of a structural change in 2006, the year in which the MPR was introduced in Nigeria, within the period of 1981 to 2021. Therefore, the test is based on three regressions in which Nigeria's aggregate savings is regressed against the country's deposit interest rate. The first regression is for the period before the structural change (i.e. 1981-2005); the second regression is for the period after the structural change (i.e. 2006-2021); while the third regression is for the full sample (i.e. 1981-2021). The null hypothesis for the test is that there is no structural change in 2006. The idea underlying the Chow test is that if a structural change truly exists in 2006, the parameters of the regressions for the periods before after the year of structural change will be different, hence the null hypothesis should be rejected.

The consequence of the existence of a structural change is that the unrestricted residual sum of squares (i.e. the addition of the residual sum of squares for the regressions of the periods before and after the structural change, which are run separately because there is no restriction that their parameters are the same) will be different from the restricted residual sum of squares (i.e. the residual sum of squares for the regression of the full sample, which is based on the restriction that there is no difference in the parameters of the periods before and after the year of the possible structural change).

The results of the Chow test are presented in Table 4 below. The results cover the Wald statistic and the probability of getting the statistic.

Table 4: Chow Test Result

Chow Breakpoint Test
Break date: 2006
Ho: No break at specified breakpoint
Sample: 1981 to 2021
Wald Statistic : 12.20956
Prob. (Chi-Square): 0.0575
Decision: Existence of structural break in 2006

Note: The Chow test is based on a regression in which the first difference of the log of gross savings is regressed against the first difference of deposit interest rate, in line with the unit root test results.
Source: Author's Computation (2024)

As shown in Table 4, there is a structural break in 2006 in the relationship between gross savings and deposit interest rate, in that the probability of getting the Wald statistic is low, which implies that the null hypothesis of no structural break should be rejected. This means that the introduction of the CBN's MPR in Nigeria in 2006 led to a significant change in the way deposit interest rate impacts on gross savings. The evidence of the existence of a structural break based on the Chow test necessitates further analysis of the break, using the dummy-based structural break technique within the framework of the ARDL cointegration model.

4.3. The Dummy-Based Structural Break Technique within the Framework of the ARDL Cointegration Model

The results of the dummy-based structural break technique within the ARDL cointegration model cover three aspects: (i) The result of the cointegration test involving the F-test. (ii) The result of the long-run model. (iii) The result of the ECM model. The results for the three aspects are presented in Tables 5, 6 and 7 below in turn.

Table 5: ARDL Bounds Cointegration Test

Test Statistic	Value		
F-statistic	5.645960		
Critical Value Bounds			
Significance	I0 Bound	I1 Bound	Evidence of Cointegration
10%	2.12	3.23	Yes
5%	2.45	3.61	Yes
2.5%	2.75	3.99	Yes
1%	3.15	4.43	Yes

Source: Author's Computation (2024)

As Table 5 shows, there is evidence of cointegration among the variables under consideration, in that the value of the F statistic falls outside the upper bounds. This means that long-run and error-correction models can be estimated. The long-run model shows the long-run relationship among the variables under consideration. On the other hand, the error-correction model shows the short-run relationship among the variables under consideration as well as the error-correction term through which equilibrium is restored in the long-run after short-run disequilibrium. The results for the long-run relationship and the error-correction model are presented in Tables 6 and 7 respectively.

Table 6: Long-Run Equation of ARDL Model; Dependent Variable, lngrsv

Variable	Coeff.	Prob.
dintr	− 0.114641	0.0012***
lnexch	0.905405	0.0000***
inf	− 0.012139	0.1441
mpr	− 5.258569	0.1474
mpr*dintr	0.319916	0.1676
mpr*lnexch	0.535699	0.0911*

Note: *** and * point to statistical significance at the 1% and 10% levels respectively. Deposit interest rate (dintr) and inflation (inf) are not logged because there are measured in percentage.

Source: Author's Computation (2024)

As Table 6 shows, an increase in deposit interest rate leads to a decrease in gross savings in the long-run, which implies that the increase in deposit rate does not motivate economic agents to save in the long-run. This suggests that economic agents are motivated to save by other factors, such as the necessity of keeping money in the bank due to the insecurity of keeping money at home and the desire to have the channel to transfer money to others. Multiplicatively interacting deposit interest rate with the MPR dummy tends to make deposit interest rate to increase aggregate savings via the channel of MPR, but the effect is not statistically significant. This means that the MPR regime tends to make deposit interest rate to be a tool of stimulating savings in the long-run, but the stimulation is not strong enough.

Furthermore, depreciation in exchange rate leads to a large and statistically significant increase of 91% in aggregate savings, which implies that in the long-run depreciation in exchange rate leads to a large financial inflow into Nigeria through exports, with economic agents saving largely from the financial inflows. The country is an export-driven economy and depreciation in exchange rate usually promotes exports. Also, interacting exchange rate with the MPR dummy multiplicatively makes depreciation in exchange rate to increase aggregate savings via the MPR channel, which means that depreciation in exchange rate stimulates savings in the MPR regime in the long-run. Finally, an increase in inflation tends to reduce aggregate savings in the long-run, but the effect is not statistically significant.

Overall, regarding structural break which is the main focus of the analysis, there is no evidence of a structural break in the relationship between gross savings and deposit interest rate in the long-run, in that the MPR dummy as well as the multiplicative interaction between the dummy and deposit interest rate do not have statistically significant impacts on gross savings in the long-run. This implies that the MPR regime is not effective in the long-run.

Table 7: Error-Correction Equation of ARDL Model; Dependent Variable, D(lngrsv)

Variable	Coeff.	Prob.
C	18.34579	0.0001***
D(lngrsv(-1))	0.288024	0.0157**
D(lngrsv(-2))	1.163224	0.0000***
D(lngrsv(-3))	0.455929	0.0064**
D(dintr)	-0.034149	0.0006***
D(lnexch)	0.561964	0.0000***
D(lnexch(-1))	-0.136354	0.0547*
D(lnexch(-2))	-0.841692	0.0000***
D(lnexch(-3))	-0.490367	0.0020***
D(inf)	0.003633	0.0214**
D(inf(-1))	0.018280	0.0000***
D(inf(-2))	0.012651	0.0002***
D(inf(-3))	0.008519	0.0005***
D(mpr)	1.096094	0.4187
D(mpr(-1))	3.191605	0.0487*
D(mpr(-2))	-0.274273	0.0947*
D(mpr(-3))	-0.847702	0.0005***
D(mpr*dintr)	0.114114	0.0001***
D(mpr*dintr(-1))	-0.077639	0.0002***
D(mpr*dintr(-2))	-0.063675	0.0103**
D(mpr*dintr(-3))	0.049547	0.0051**
D(mpr*lnexch)	-0.466180	0.1116
D(mpr*lnexch(-1)	-0.768672	0.0239**
ECM(-1)	-0.684519	0.0001***

Note: ***, ** and * point to statistical significance at the 1%, 5% and 10% levels respectively. Deposit interest rate (dintr) and inflation (inf) are not logged because there are measured in percentage.
Source: Author's Computation (2024)

As Table 7 shows, the first three lags of the first difference of gross savings have positive and statistically significant impacts on its current value, which implies that the past values of the variable are an important determinant of its current value in the short-run. An increase in the first difference of deposit interest rate leads to a decrease in the first difference of gross savings in the short-run, which implies that the increase in deposit rate does not motivate economic agents to save in the short-run. As in the case of long-run, in the short-run economic agents are motivated to save by other factors, such as the necessity of keeping money in the bank due to the insecurity of keeping money at home and the desire to have the channel to transfer money to others. Babalola and Abdul (2022) show that deposit interest rate does not stimulate savings in Nigeria and that savings are stimulated by other factors such as the ones mentioned above.

However, the current value and third lag of the first difference of deposit interest rate have positive impacts on gross savings to the tune of 11% and 5% respectively in the short-run through the channel of MPR. This means that the MPR regime makes deposit interest rate to be an effective tool of stimulating savings in the short-run. The first lag of the first difference of MPR itself has a large and statistically significant impact on gross savings of over 300% on gross savings in the short-run. A small increase in inflation leads to an increase in gross savings in the short-run in the short-run. Furthermore, depreciation of exchange rate leads to a large increase in aggregate savings in the short-run, but the interaction of exchange rate with the MPR dummy has a different impact, in that it is appreciation of exchange rate that leads to an increase in gross savings through the channel of MPR.

Overall, regarding structural break which is the main focus of the analysis, there is evidence of a structural break in the relationship between gross savings and deposit interest rate in the short-run, in that the MPR dummy as well as the multiplicative interaction between the dummy and deposit interest rate have positive and statistically significant impacts on gross savings in the short-run. This implies that the MPR regime is effective in the short-run, in that it makes deposit interest rate to stimulate savings in the short-run. Udude (2015) investigates the impact of deposit interest rate on gross savings in Nigeria, examining both short-run and long-run impacts, using Johansen cointegration technique and the vector autoregressive (VAR) model. The results show that there is no evidence of long-run relationship between the variables, but there is evidence of short-run impact of deposit interest rate on gross savings.

Basically, the magnitude of the impact of deposit interest rate on savings in Nigeria depends on the change in deposit interest rate induced by the change in MPR through the pass-through effect. However, as Greǵor *et al*., (2019) note, pass-through from a central bank's policy rate to deposit interest rate is determined by macroeconomic, financial and institutional conditions of the concerned country. Mordi *et al*. (2019) examine pass-through from MPR to deposit interest rate and other market rates in Nigeria, using an error-correction model that accounts for structural breaks. The authors find that the degree of pass-through is not strong enough, which affects the way the market rates impact on monetary policy outcomes such as savings in the short-run and long-run.

5. Conclusion and Recommendations

This paper investigated whether there was a structural change in the relationship between deposit interest rate and aggregate savings in Nigeria in 2006, due to the introduction of the MPR, using the Chow test and the dummy-based structural change technique within the framework of the ARDL cointegration model. The conclusion reached from the findings of the paper is two-fold. Firstly, the introduction of the MPR as CBN's policy rate in 2006 in Nigeria induced a structural change in the relationship between gross savings and deposit interest rate in the country. Secondly, the structural change only occurred in the short-run, based on further evidence obtained from the dummy-based structural change technique within the framework of the ARDL model.

Based on the conclusion, the study has two recommendations. Firstly, the MPR should be maintained in Nigeria because the structural change it induced implies that it is impactful on monetary policy variables in the country. Secondly, monetary policy measures need to be tailored towards making deposit interest rate to increase aggregate savings via the MPR channel in Nigeria in the short-run and long-run and not in the short-run only. This will make deposit interest rate to be an effective tool of stimulating savings in the country in the two periods.

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