

CENTRAL BANK OF NIGERIA CONTEMPORARY MONETARY POLICY AND BANKS PROFITABILITY: AN ARDL APPROACH

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ABSTRACT

This study examines effects of the Central Bank of Nigeria (CBN) monetary policy on the profitability of commercial banks in Nigeria. The study was based on country aggregate level annual data that covered a period of 35 years, 1980-2014. Methodologically, the study use a multivariate regression analysis under an econometric framework. The results show that monetary policy rate, cash reserve ratio and exchange rate annually, cause a long and short run increase on banks profitability, while, treasury bill rate and liquidity ratio annually, cause a long and short run decrease on banks profitability. Also, this study revealed that the long run impacts of the CBN monetary policy on banks profitability are similar to the short run impacts. The implication of the findings suggests that the profitability of the banking sector is not a function of banks charges through high lending rates as against maximum rates as their circumstances may allow only, but also, changes in monetary policy This study therefore recommends that, monetary authorities should adopt monetary policies that will help Nigerian deposit money banks to improve on their profitability and there is need to review and strengthen bank lending rate policies through effective and efficient regulation and supervisory framework.

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Keywords: CBN, Monetary Policy, Bank Profitability

1.0 Introduction

Commercial banks are the front-line troops when it comes to implementing monetary policy, because of this connection, they as a group are influenced heavily by the actions of the nation's monetary policymakers, this influence is reflected not only in the volume of commercial bank activity but also in the composition of bank assets and liabilities (Eastburn and Hoskins, 1978). Consequently, they hold liquid assets as a buffer against the unexpected. Some of this buffer maybe held in

earning assets such as Treasury bills and some may be held in nonearning assets such as cash reserves. This liquidity gives them flexibility in taking advantage of new profit opportunities as they arise or in meeting unexpected cash or deposit drains.

Responsibility for monetary policy lies primarily with the monetary authorities, such as the Central Bank of Nigeria (CBN). The monetary authorities often employ certain monetary policy instruments like bank rate,

open market operation (buying and selling government securities), raising or lowering the discount rate (the interest rate on loans to member banks), changing reserve requirements and other selective credit control instruments. Policymakers at the central banks are charged with managing the nation's money supply so as to produce stable prices, high employment, and stability in the external value of the dollar. Their objective is to foster a monetary environment that will further these economic goals. Although, some objectives are consistent with each other's, others are not, for example, the objectives of price stability often conflicts with the objectives of interest rate stability and high short run employment.

By manipulating monetary policy instruments such as credit and exchange rate, central banks affect the rate of growth of the money supply, the level of interest rate, security prices, credit availability and liquidity creation from the hand of commercial bank. These factors, in turn can exert monetary imbalances or shocks on the economy by influencing the level of investment, consumption, imports, exports, government spending, total output, income and price level in the economy (Mishra and Pradhan, 2008).

Recent contemporary monetary policies are assumed to change the profit direction of commercial banks. Banking sector reforms are part of monetary policy instruments for effective monetary systems and major shifts in monetary policy transmission mechanisms in the last decade in both developed and developing nations (Enyioko, 2012). In this regard, an appropriate analysis of monetary shock transmission mechanisms is of crucial importance for central banks. This is to determine the process through which monetary policy influence the entire economy within the financial system framework.

In recent times Nigeria monetary policy has been based on a medium-term perspective framework. The shift was to free monetary

policy implementation from the problem of time inconsistency and minimize over-reaction due to temporary shocks. Policies have ranged from targeting monetary aggregates to monitoring and manipulating policy rates to steer the interbank rates and by extension other market rates in the desired direction. As at date inflation targeting and interest rate control among other policies are yearning for adequate attention by CBN as ways to have a tighter grip on monetary policy implementation in Nigeria.

The policymaker looks at the economy as a whole, but the banker must focus on his or her own corporation's profitability, liquidity, and solvency. Monetary policy is just one more item to cope with in addition to customer loan demand, deposit flows, and market interest rates. Commercial banks cannot always accurately predict future loan demand, interest rates, and deposit flows

As the monetary authority swings into action, bankers make adjustments in their balance sheets in the interest of earning profits. But what kinds of changes do they make and what is the impact on profits? These reforms focused on structural changes and use of monetary policy, especially interest rate administration and foreign exchange management (Okoye and Udeh, 2009).

Monetary policy actions have brought about significant adjustments in the liability side of bank balance sheets. However, they affect the liability picture for large and small banks somewhat differently. Despite establishing regulatory agencies and monetary policy committees, Nigerian banks have actually been deterred in creating adequate liquidity and additional credit for the sustenance of the entire economy (Ajayi and Atanda, 2012).

In the light of the strategic nature of this study, it has become important to assess the relative role of different CBN current monetary policy instruments in explaining the profitability outcomes in Nigerian commercial

banking. Many studies have showed that the profitability of the banking sector depends on banks' charges through high lending rates as against maximum rates as their circumstances may allow only. This study aims to fill in the gap by estimating how changes in monetary policy could affect the profitability of the banks.

The main aim of this paper, therefore, is to empirically investigate between 1980 and 2014, the relationship that exists between monetary policy instruments such as monetary policy rate, cash reserve ratio, liquidity ratio, treasury bill rate and exchange rate and the commercial banks' profitability in Nigeria. The main research question is there, a short and long run relationship between the CBN monetary policy and the commercial banks' profitability? Other range of questions of concern are as follows: What are the monetary policy tools used in regulating the banking industry? To what extent has monetary policy instruments such as Monetary Policy Rate, Cash Reserve Ratio, Liquidity Ratio, Treasury Bill Rate and Exchange Rate on banks' profitability in Nigeria? Is there any long and short run relationship between the bank profitability and the CBN monetary policy instruments?

This study is organised into 6 sections. Section one is the introduction, giving a general idea of the research. Section 2 covers the basic gamut of the existing literature on the issue, both the theoretical and empirical. Section 3 shows the study's theoretical framework, model specification, analytical framework and estimation techniques. While section 4 is the analysis of empirical results of the study. Section 5 and 6, give the policy implication and conclusion and recommendations of the study, respectively.

2.0. Literature Review

Monetary policy instruments are classified into the distinct groups namely; traditional, direct control and qualitative methods.

Ndiomu (1993) is of the opinion that, the traditional instruments require the existence of a developed and a properly functioning money market and these are confined to the short-term. The market direct control instrument are non-market weapons used in developing countries to strike at the liquidity of commercial banks while qualitative instruments are aimed at influencing the direction of bank advances and the amount that go into any particular sector of the economy.

Economists have been interested in the effect of monetary policies in the economy. Recent studies have analysed the impact of market structure on profitability in the banking industry. In general, some of these studies have concluded that market structure does not significantly influence profitability. In contrast, most studies of pricing policy have found that 'the prices of bank services increase with the degree of monopoly in the banking sector. In view of this, it is therefore pertinent to evaluate the impact of monetary policy on commercial banks (Akanbi and Ajagbe (2012)

According to Frederic and Kenichi (2014), the overall effect of unconventional monetary policies on banks' profitability and risk is thus theoretically unclear. Both the benefits and costs, however, should be reflected in the changes in banks' stock prices and their bond risk premia at the time of announcement of new monetary policy measures. Profitability of the banking sector is a subject that has received a lot of attention in recent years. There is now a large literature which has examined the role played by monetary authorities and management of resources in determining bank profitability (Aremu, Ekpo and Mudashiru, 2013). The effects of monetary policy either expand banking activity or contract it. And when it contracts it, profitability in banking is constrained.

One principal objective of Banks is to earn more profit. According to Ogunbiyi and

Ihejirika (2014), profitability is a bank's first line of defense against unexpected losses, as it strengthens its capital position and improves future profitability through the investment of retained earnings. An institution that persistently makes a loss will ultimately deplete its capital base, which in turn puts equity and debt holders at risk. Moreover, since the ultimate purpose of any profit-seeking organization is to preserve and create wealth for its owners, the bank's return on equity (ROE) needs to be greater than its cost of equity in order to create shareholder value. Therefore, having the knowledge of factors influencing commercial banks' profitability is not only important but also essential in stabilizing the economy. The importance of banks' profitability cannot be over emphasized. Profitability is considered as a crucial objective to conduct a business without which money deposit banks will not be in business. With good profit figures, banks are able to enhance the confidence of their stakeholders, maximize shareholders wealth as well as being able to stay competitive in the financial market. However, to achieve their desired level of profits, banks are confronted with several factors both internal and external. One of such external factors is the interest rate.

A company remains in operation because it expects to make profits. Once that expectation is confirmed unattainable, the most rational decision is to close shop or exit the business. Three indicators, namely: Net Interest Margin (NIM), Return on Assets (ROA) and Return on Equity (ROE) were identified by Ahmed (2003) to be widely employed in the literature to measure profitability. However, there are divergent views among scholars on the superiority of one indicator over the others as a good measure of profitability. For instance, Uchendu (1995) believed that the three indicators are all good. Hancock (1989) used only ROE to measure profitability in her study. Also, Odufulu (1994) used only the

gross profit margin in measuring profitability. Ogunleye (1995) did not believe that profit level per se could constitute a good Measure of profitability and therefore used ROA and ROE. Profitability measures, according to Akinola (2008) include Profit Before Tax (PBT), Profit After Tax (PAT), ROE, Rate of Return on Capital (ROC) and ROA. Sanni (2009) used Earnings Per Share (EPS). For this study, we shall limit profitability to the three widely used measures namely Return on Asset (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) as this study is built on the work of Krakah and Ameyaw (2010).

The existence, growth and survival of a business organization mostly depend upon the profit which an organization is able to earn. It is true that when Profitability increases the value of shareholders may increase to considerable extent. The term profitability refers to the ability of the business organization to maintain its profit year after year. The profitability of the organization will definitely contribute to the economic development of the nation by way of providing additional employment and tax revenue to government exchequer. Moreover, it will contribute the income of the investors by having a higher dividend and thereby improve the standard of living of the people (Aremu et al, 2013).

Stein (2012) stated that, in the short run, banks engaging in maturity transformation should gain from low short-term rates as long as the long-term rates remain relatively stable. Similarly, banks can gain from borrowing at low cost and investing in assets delivering higher returns provided that policies do not depress the returns on those assets as well. Moreover, banks may take advantage of any reduction in term premia to replace short-term debt with long-term debt and reduce the risk of maturity mismatches in their balance sheets.

Heuvel (2005) argued that monetary policy affects bank lending through two

channels. They argued that by lowering bank reserves, contractionary monetary policy reduces the extent to which banks can accept reservable deposits, if reserve requirements are binding. The decrease in reservable liabilities will, in turn, lead banks to reduce lending, if they cannot easily switch. The relation between monetary policy and bank behavior has also been the object of studies that concern with oligopolistic bank sectors, as for example Glocker and Towbin (2012).

Punita and Somaiya (2006) investigated the impact of monetary policy on the profitability of banks in India between 1995 and 2000. The monetary variables are banks rate, lending rates, cash reserve ratio and statutory ratio, and each regressed on banks profitability independently. Lending rate was found to exact positive and significant influence on banks' profitability, which indicates a fall in lending rates will reduce the profitability of the banks. Also, bank rate, cash reserve ratio and statutory ratio were found to have significantly affect profitability of banks negatively. Their findings were the same when lending rate, bank rate, cash reserve ratio and statutory ratio were pooled to explain the relationship between bank profitability and monetary policy instruments in the private sector.

Ogunbiyi and Ihejirika (2014) examined how interest rates affect the profitability of deposit money banks in Nigeria. The study was based on country aggregate level annual data that covered a period of thirteen years 1999 to 2012 and made use of multivariate regression analysis under an econometric framework. The estimated results show that Maximum lending rate, Real Interest rate and Savings deposit rate have negative and significant effects on the profitability of Nigerian deposit money banks as measured by return on assets at the 5% level of significance. Also, the study found that Real interest rate at the 8% level of significance has negative and significant relationship with Return on Equity

of money deposit banks in Nigeria. On the other hand, the study found no significant relationship between interest rate variables and Net Interest Margin of Deposit Money Banks in Nigeria.

There have been some studies relating to the profitability of commercial banks in Nigeria.

Okoye, and Eze, (2013) study the impact of bank lending rate on the performance of Nigerian Deposit Money Banks between 2000 and 2010. It specifically determined the effects of lending rate and monetary policy rate on the performance of Nigerian Deposit Money Banks and analyzed how bank lending rate policy affects the performance of Nigerian deposit money banks. They found that lending rate and monetary policy rate has significant and positive effects on the performance of Nigerian deposit money banks. Akabom-Ita, (2012) examined the impact of interest rate on net assets of multinational companies in Nigeria from 1995 - 2010. The regression analysis showed that an increase in interest rate results in reduction in net assets.

Ajayi and Atanda, (2012) access the effect of monetary policy instruments on banks performance in Nigeria. The empirical estimates indicated that bank rate, inflation rate and exchange rate are total credit enhancing, while liquidity ratio and cash reserves ratio exert negative effect on banks total credit. Although, it is only cash reserve ratio and exchange rate found to be significant at 5% critical value. However, the cointegration test indicated that the null hypothesis of no cointegration was accepted. The main conclusion draw is that monetary policy instruments are not effective to stimulate credit in the long-run, while banks total credit is more responsive to cash reserve ratio.

Enyioko (2012) examine the performances of banks in Nigeria based on the interest rate policies of the banks. The study analyzed published audited accounts of twenty (20) out

of twenty-five (25) banks that emerged from the consolidation exercise and data from the Central Banks of Nigeria (CBN). Applying regression and error correction methods to analyze the relationship between interest rates and bank performance the study found that interest rate policies have not improved the overall performances of banks significantly. Similarly, Ahmad (2003) reported that interest on loan is the largest constituent of income for Nigerian banks as evidenced from available data and that movement from one interest regime to another could have some effects on the profitability of banks in the system.

Ogunleye (2001) in a study of the monetary policy influence of bank's profitability, using data from Nigerian banks found the determinants of bank profitability to include reserve ratio, permissible credit growth, stabilization securities and exchange rate. The study also found determinants of banks' profitability to include total deposits, Treasury bill rates and lending rates. Influence of Monetary Policy on the Banking Sector in Nigeria. According to David-Douglas (2001), banking is all about control of funds and valuable materials; and monetary policy is all about control of money supply by the monetary authorities in order to achieve stated or desired economic goals. Among these objectives is price stability which in turn is likely to restrain banking business and profitability (Ajayi, 1979).

Ogunleye (2001) in a study of the monetary policy influence of bank's profitability, using data from Nigerian banks found the determinants of bank profitability to

include reserve ratio, permissible credit growth, stabilization securities and exchange rate. The study also found determinants of banks' profitability to include total deposits, Treasury bill rates and lending rates. Uchendu (1995) investigated the effect of monetary policies on the performance of Nigerian commercial banks. He found that the dominant factors influencing bank profitability are interest rates, exchange rate, bank reserves, banking structure and unit labour costs, particularly when return on capital is used as measure of profitability. He concluded that stable and realistic monetary and banking policies are important for the profitability of commercial banking business in Nigeria.

3. Theoretical Framework, Model Specification, Analytical Framework and Estimation Techniques

3.1 Theoretical Framework

We follow Eleni and Varelas (2013) derivation of the influence of monetary policy on the optimal behaviour of a monopolistic bank. They discussed how the overdraft rate and the minimum reserve requirements affect the equilibrium values of lending rate and deposit rate as well as the corresponding quantities, when there is only one commercial bank in the economy and the Central Bank.

Eleni and Varelas (2013) assume there is only one commercial bank in the economy and the Central bank. The commercial bank operates as a monopolist of the economy. In order to maximize its profits subjected to the balance sheet constraint, the bank chooses the optimal rates on loans and deposits.

The demand function for loans is given by:

$$L(r_L) = a_0 - a_1 r_L \quad a_0 \geq 0, \quad a_1 > 0 \quad (1)$$

According to relation (1), the demand for loans is a negative function of the lending rate (r_L). The supply function of deposits has as follows:

$$D(r_D) = d_0 + d_1 r_D \quad d_0 \geq 0, \quad d_1 > 0 \quad (2)$$

This function has upward slope, showing that the deposit supply and the corresponding interest rate (r_D) are related positively.

The difference between the volume of deposits (D) and the sum of the volume of loans (L) and the reserve requirements is defined as the net position of the bank. In the context of a monopolistic banking system, the net position cannot be positive, as in this case the bank cannot lend it on the Central Bank. Consequently, it is negative or zero. If it is negative, the bank borrows from the Central Bank to satisfy the liquidity needs. As the supreme bank of the country and the bankers' bank, the Central Bank acts as the lender of the last resort. For this reason, the commercial bank has an overdraft account to the Central Bank.

Under the assumption of a linear functional form, the net position of the bank with respect to Central Bank is given by:

$$M = (1 - a)D - L \leq 0 \quad (3)$$

where $a \in (0, 1)$ denotes the fraction of the minimum reserve requirements, which is determined exogenously by the Government or the Central Bank.

The profit function of the monopolistic bank is given by the difference between total revenues (TR) and total cost (TC). That is:

$$\Pi = TR - TC \quad (4)$$

The total revenues are comprised by the total amount of the interest rate received by loans ($r_L L$) and the total amount of the exogenous rate of government bonds ($r_B B$). Moreover, the total cost is the sum of the fixed cost (c) and the variable cost. The latter has three components: the total amount of the interest rate paid to depositors ($r_D D$) the total amount of the overdraft rate paid to Central Bank ($r |M|$) and the operational cost. We assume that the operational cost is a constant fraction of deposits ($kD, 0 < k < 1$).

Taking into account the above clarifications, the bank's profit function is transformed as follows:

$$\Pi(r_L, r_D) = r_L L + r_B B - r |M| - r_D D - c - kD \quad (5)$$

Substituting the relations (1), (2) & (3) to (5), we obtain:

$$\Pi(r_L, r_D) = r_L (a_0 - a_1 r_L + a_1 r) + r_B B + r_D [r(1-a)d_1 - d_0 - d_1 r_D - kd_1] + r(1-a)d_0 - ra_0 - c - kd_0 \quad (6)$$

The monopolistic bank maximizes its profit function subjected to the balance sheet constrain:

$$R + B + L = K + D \quad (7)$$

where

$$R = aD, 0 < a < 1 \quad (8)$$

The substitution of the relations (3.1), (3.2) & (3.8) to (3.7), implies:

$$R + B + L = K + D \stackrel{(8)}{\Rightarrow} aD + B + L = K + D \Rightarrow L = K + (1-a)D - B \stackrel{(1),(2)}{\Rightarrow} a_0 - a_1 r_L = K + (1-a)(d_0 + d_1 r_D) - B \quad (9)$$

The problem of the monopolistic bank can be stated as follows (relations (6) and (9)):

$$\max_{r_L, r_D} \Pi(r_L, r_D) = r_L(a_0 - a_1 r_L + a_1 r) + r_B B + r_D[r(1-a)d_1 - d_0 - d_1 r_D - k d_1] \\ + r(1-a)d_0 - r a_0 - c - k d_0$$

$$s.t. a_0 - a_1 r_L = K + (1-a)d_0 + d_1 r_D - B$$

In order to solve the above problem, we are going to use the Lagrangian function:

$$Q(r_L, r_D, q) = r_L(a_0 - a_1 r_L + a_1 r) + r_B B + r_D[r(1-a)d_1 - d_0 - d_1 r_D - k d_1] \\ + r(1-a)d_0 - r a_0 - c - k d_0 + q[a_0 - a_1 r_L - K - (1-a)(d_0 + d_1 r_D) + B]$$

where q denotes the Lagrange multiplier. It can be interpreted as the change in the profit function due to a unit change in the bank's net position.

The first order necessary and sufficient conditions for an extremum are described by the following equations

$$\frac{\partial Q(\cdot)}{\partial r_L} = 0 \Rightarrow a_0 - 2a_1 r_L + a_1 r - q a_1 = 0 \quad (10)$$

$$\frac{\partial Q(\cdot)}{\partial r_D} = 0 \Rightarrow r(1-a)d_1 - d_0 - 2d_1 r_D - k d_1 - q(1-a)d_1 = 0 \quad (11)$$

$$\frac{\partial Q(\cdot)}{\partial q} = 0 \Rightarrow a_0 - a_1 r_L - K - (1-a)(d_0 + d_1 r_D) + B = 0 \quad (12)$$

From the solution of the system of the first order conditions, we deduce the optimal rates on loans and deposits and the Lagrange multiplier,

$$r_L^*(r, a, k, B, K), r_D^*(r, a, k, B, K) \& q^*(r, a, k, B, K) \text{ respectively.}$$

To check for maximum, we use the determinant of the bordered Hessian matrix:

$$|\bar{H}| = \begin{vmatrix} 0 & -a_1 & -(1-a)d_1 \\ -a_1 & -2a_1 & 0 \\ -(1-a)d_1 & 0 & -2d_1 \end{vmatrix} = 2a_1 d_1 [(1-a)^2 d_1 + a_1] > 0$$

Consequently, the second order condition is satisfied.

Monetary Policy Implications

Taking the total differential of the first order conditions (relations (10), (11) and (12)) and presuming that $dk = dB = dK = 0$ we obtain the following system of equations in matrix form:

$$\Delta \begin{bmatrix} dr_L^* \\ dr_D^* \\ dq^* \end{bmatrix} = \begin{bmatrix} -a_1 dr \\ -(1-a)d_1 dr + (r-q)d_1 da \\ -(d_0 + d_1 r_D) da \end{bmatrix} \quad (13)$$

$$\Delta = \begin{bmatrix} -2a_1 & 0 & -a_1 \\ 0 & -2d_1 & -(1-a)d_1 \\ -a_1 & -(1-a)d_1 & 0 \end{bmatrix}$$

where

The determinant of the matrix Δ , that is $|\Delta|$, is positive:

$$|\Delta| = \begin{vmatrix} -2a_1 & 0 & -a_1 \\ 0 & -2d_1 & -(1-a)d_1 \\ -a_1 & -(1-a)d_1 & 0 \end{vmatrix} = 2d_1[a_1 + (1-a)^2 d_1] > 0 \quad (14)$$

The Overdraft Rate as a Policy Instrument

Assuming that $dr \neq 0$ and $da = 0$ and applying the Cramer's Rule, we can determine the partial derivatives r_L^* and r_D^* with respect to r :

$$\frac{\partial r_L^*}{\partial r} = 0 \quad (15)$$

$$\frac{\partial r_D^*}{\partial r} = 0 \quad (16)$$

According to equations (15) and (16), a change in the overdraft rate (r) has no impact on the optimal interest rates on loans and deposits, respectively. Hence, the same holds in the case of the interest rate spread. That is:

$$\frac{\partial(r_L^* - r_D^*)}{\partial r} = \frac{\partial r_L^*}{\partial r} - \frac{\partial r_D^*}{\partial r} = 0 \quad (17)$$

From equations (1) and (15), we find:

$$\frac{\partial L^*}{\partial r} = \frac{\partial L^*}{\partial r_L} \frac{\partial r_L^*}{\partial r} = -a_1 \frac{\partial r_L^*}{\partial r} = 0 \quad (18)$$

Relations (3.2) and (3.16), imply:

$$\frac{\partial D^*}{\partial r} = \frac{\partial D^*}{\partial r_D} \frac{\partial r_D^*}{\partial r} = -d_1 \frac{\partial r_D^*}{\partial r} = 0 \quad (19)$$

We infer that monetary policy via the overdraft rate affects neither the optimal interest rates on loans and deposits nor the corresponding quantities. The absence of overdraft-rate influence on the interest rates spread of the monopolistic bank is something that should be expected. The reason is that the different timing structure between deposits and lending induces in general a commercial bank to resort often to its overdraft account with the Central Bank. Consequently, changes in the overdraft rate do not affect the interest rates. That is, a

commercial bank is impelled by the circumstances to internalize this short-term cost, without passing it over to its clients, since there is no interbank market as an alternative solution.

The Minimum Reserve Requirements as a Policy Instrument

Providing that $dr = 0$ and $da \neq 0$ applying the Cramer's Rule, we deduce the partial derivatives of and with respect to q :

$$\frac{\partial r_L^*}{\partial a} = \frac{(r-q)(1-a)d_1 + 2(d_0 + d_1 r_D)}{2[a_1 + (1-a)^2 d_1]} \quad (20)$$

$$\frac{\partial r_D^*}{\partial a} = \frac{(r-q)a_1 + 2(1-a)(d_0 + d_1 r_D)}{2[a_1 + (1-a)^2 d_1]} \quad (21)$$

From relations (3.20) and (3.21):

$$\frac{\partial(r_L^* - r_D^*)}{\partial a} = \frac{\partial r_L^*}{\partial a} - \frac{\partial r_D^*}{\partial a} = \frac{(r-q)[(1-a)d_1 + a_1] + 2a(d_0 + d_1 r_D)}{2[a_1 + (1-a)^2 d_1]} \quad (22)$$

Taking from relation (3.1) the partial derivative of L^* with respect to a and using relation (20), we obtain:

$$\frac{\partial L^*}{\partial a} = \frac{\partial L^*}{\partial r_L} \frac{\partial r_L^*}{\partial a} = -a_1 \frac{\partial r_L^*}{\partial a} = 0 \quad (23)$$

$$\frac{\partial D^*}{\partial a} = \frac{\partial D^*}{\partial r_D} \frac{\partial r_D^*}{\partial a} = -d_1 \frac{\partial r_D^*}{\partial a} = 0 \quad (24)$$

It is clear that the effects of a change in a on L^* and r_L^* are of the opposite sign, while D^* and r_D^* move towards the same direction after a change in a .

In order to determine the sign of the implication of monetary policy via the minimum reserve requirements on the optimal rates and amounts of loans and deposits, we apply mathematical investigation. It is noteworthy that all the interest rates, the overdraft rate, the lending rate and the deposit rate, are nominal rates and as a result their values belong in the interval (0,1).

Setting the relation (20) equal to zero and solving with respect to $r-q$, we have:

$$\begin{aligned} \frac{\partial r_L^*}{\partial a} &= \frac{(r-q)(1-a)d_1 + 2(d_0 + d_1 r_D)}{2[a_1 + (1-a)^2 d_1]} = 0 \Rightarrow \\ \Rightarrow r-q &= -\frac{2(d_0 + d_1 r_D)}{(1-a)d_1} < 0 \end{aligned} \quad (25)$$

Equating relation (21) to zero, we obtain:

$$\begin{aligned} \frac{\partial r_D^*}{\partial a} &= \frac{-(r-q)a_1 + 2(1-a)(d_0 + d_1 r_D)}{2[a_1 + (1-a)^2 d_1]} = 0 \Rightarrow \\ \Rightarrow r-q &= \frac{2(1-a)(d_0 + d_1 r_D)}{a_1} > 0 \end{aligned} \quad (26)$$

Similarly, from equation (3.22), we have:

$$\frac{\partial(r_L^* - r_D^*)}{\partial a} = \frac{(r - q)[(1 - a)d_1 + a_1] + 2a(d_0 + d_1 r_D)}{2[a_1 + (1 - a)^2 d_1]} = 0 \Rightarrow$$

$$\Rightarrow r - q = -\frac{2a(d_0 + d_1 r_D)}{[(1 - a)d_1 + a_1]} < 0 \quad (27)$$

The determination of the sign requires the ordering of the roots (25) and (27). From model's assumptions, it holds that $0 < a < 1$. So,

$$a < 1 \Rightarrow 2a(d_0 + d_1 r_D) < 2(d_0 + d_1 r_D) \quad (28)$$

Moreover, due to the fact that $a_1 > 1$, we get:

$$a_1 > 1 \Rightarrow (1 - a)d_1 + a_1 > (1 - a)d_1 \Rightarrow \frac{1}{(1 - a)d_1 + a} < \frac{1}{(1 - a)d_1} \quad (29)$$

Multiplying the inequalities (28) & (29) by members:

$$\frac{2a(d_0 + d_1 r_D)}{(1 - a)d_1 + a_1} < \frac{2(d_0 + d_1 r_D)}{(1 - a)d_1} \Rightarrow -\frac{2a(d_0 + d_1 r_D)}{(1 - a)d_1 + a_1} > -\frac{2(d_0 + d_1 r_D)}{(1 - a)d_1} \quad (30)$$

The following table summarizes the sign of the impact of a change in on the equilibrium rates and quantities, when the term $r - q$ is negative (Table 1):

Table1. Determination of the effects of a change in a , $r - q < 0$ when

$r - q$	$-\infty, -\frac{2(d_0 + d_1 r_D)}{(1 - a)d_1}$	$\left(-\frac{2(d_0 + d_1 r_D)}{(1 - a)d_1}, -\frac{2a(d_0 + d_1 r_D)}{(1 - a)d_1 + a_1} \right)$	$-\frac{2a(d_0 + d_1 r_D)}{(1 - a)d_1 + a_1}, 0$
$\partial r_L^* / \partial a$	—	+	+
$\partial r_D^* / \partial a$	+	+	+
$\partial(r_L^* - r_D^*) / \partial a$	—	—	+
$\partial L^* / \partial a$	+	—	—
$\partial D^* / \partial a$	+	+	+

It is inferred that:

- If the value interval of $r - q$ is the first one, the optimal lending rate (r_L^*) decreases after an increase in the minimum reserve requirements, while the optimal deposit rate (r_D^*) increases. Consequently, the magnitude of the spread ($r_L^* - r_D^*$) declines. As far as the equilibrium

levels of loans and deposits are concerned, an increase in leads in an increase in both of them.

- When $r - q$ takes values in the second interval, a restrictive monetary policy via is followed by an increase in the optimal rate on loans (r_L^*). The same holds in the case of the equilibrium rate on deposits (r_D^*).

However, the spread $(r_L^* - r_D^*)$ declines, showing that the change in r_D^* is greater than the corresponding change in r_L^* . Concerning the equilibrium amounts of loans and deposits, we can observe a reduction in the equilibrium level of loans (L^*) and a rise in the equilibrium level of deposits (D^*)

- iii. If the value interval of $r - q$ is the last one, an increase in leads to an increase in both the optimal rate on loans (r_L^*) and the optimal rate on

deposits (r_D^*). Furthermore, the restrictive monetary policy affects positive the spread $(r_L^* - r_D^*)$, implying that the aforementioned change in r_L^* is greater than the corresponding change in r_D^* . Finally, regarding the equilibrium levels of loans and deposits, we observe a decrease in the level of loans (L^*) and an increase in the level of deposits (D^*).

Table 2 depicts the sign of the effect of a change in on the optimal rates and amounts of loans and deposits, for positive values of the term $r - q$:

Table 2. Determination of the effects of a change in a , $r - q > 0$ when

$r - q$	$\left(0, \frac{2(1-a)(d_0 + d_1 r_D)}{a_1}\right)$	$\left(-\frac{2(1-a)(d_0 + d_1 r_D)}{a_1}, +\infty\right)$
$\partial r_L^* / \partial a$	+	+
$\partial r_D^* / \partial a$	+	—
$\partial(r_L^* - r_D^*) / \partial a$	+	+
$\partial L^* / \partial a$	—	—
$\partial D^* / \partial a$	+	—

We observe that:

- i. When the value interval of $r - q$ is the first one, an increase in the fraction of reserve requirements is followed by an increase in both the optimal lending rate (r_L^*) and the optimal deposit rate (r_D^*). Furthermore, the increase in leads to an increase in the spread $(r_L^* - r_D^*)$ implying that the change in r_L^* is greater than the corresponding change in r_D^* . Concerning the equilibrium amounts of loans and deposits, we can

observe a reduction in the equilibrium level of loans (L^*) and an increase in the equilibrium level of deposits (D^*)

- ii. If the value interval of $r - q$ is the second one, restrictive monetary policy via leads to an increase in the equilibrium lending rate (r_L^*), while the deposit rate declines (r_D^*). Consequently, the magnitude of the spread $(r_L^* - r_D^*)$ increases. Regarding the equilibrium levels of loans and deposits, both of them decrease after

an increase in α (see Eleni and Varelas, 2013).

3.2 Model Specification

With inferences from the reviewed Eleni and Varelas (2013) theoretical model above, an empirical model to dilate the relationship

$$ROE_t = \beta_0 + \beta_1 MPR_t + \beta_2 LOGCRR_t + \beta_3 TBR_t + \beta_4 LQR_t + \beta_5 EXR_t + \beta_6 T_t + \mu_t \quad (35)$$

ROE = Net Income / Average Total Equity. Bank profitability variables is measured by bank return on equity (ROE). MPR_t , is the Monetary Policy Rate at time t . To capture the impact of monetary transmission through the interest rate channel we have chosen the minimum rediscount rate recently christened monetary policy rate in Nigeria. CRR_t , is the Cash Reserve Requirement at time t . LQR is the Liquidity ratio at time t . TBR_t is the Treasury Bills Rate at time t . Treasury Bills is proxy as Open Market Operations. EXR_t is the Exchange Rate at time t . T_t is the linear trend at time. To capture the exchange rate transmission channel of monetary policy we have included the data of exchange rate of the Nigeria Naira vis-à-vis the United States dollar. β_0 is constant, $\beta_1 - \beta_5$ are slopes and $\mu_t \sim \text{NIID}(0,1)$ thus, a white noise stochastic disturbance term and time t is in annually.

We outline our apriori expectation of the sign and magnitude of each included parameter, based on the provisions of theory and the findings of previous studies by scholars with similar interest. Therefore, we expect as the

$$\Delta y_t = \phi_1 y_{t-1} + \beta_1' x_{t-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{t-j} + \sum_{j=0}^{q-1} \delta_{ij}' \Delta x_{t-j} + \varepsilon_t \quad (36)$$

The time series are denoted by $t = 1, 2, \dots, T$ represent time periods; y_t is the dependent

between the CBN monetary policy and the commercial bank profitability in Nigeria and would be specified, this include other explanatory variables as defined below in this study after a modification of some equations in the theoretical model. The empirical model adopted in this study is thus specified as

apriori expectation the parameters β_1 and β_4 to be less than zero, while $\beta_0, \beta_2, \beta_3$ and β_5 are expected to be greater than zero.

3.3 Analytical Framework

The long-term behaviour of variables propose an intermediate estimator that allows the short-term parameters to differ in the short run, while imposing equality of the long-term coefficients. The long-term movements of the real effective exchange rate and other macroeconomic fundamentals are expected to be stable, but short-term movements are expected to be not stable within the period under review. The dynamic heterogeneous time series model is an unrestricted error correction autoregressive distributed lag (ARDL) represented as $(p, q_1, \dots, q_k)$, where p , is the number of lags of the dependent variable, q_1 is the number of lags of the first explanatory variable, and q_k is the number of lags of the k -th explanatory variable (see Combes, et al, 2011).

An ARDL model may be written as:

variable; x_t the matrix of regressors ; ϕ_1 the coefficient on the lagged dependent variable;

β_i the vector of coefficients on the explanatory variables; λ_{ij} the coefficients on the lagged first-differences of the dependent variable; and δ_{ij} the coefficients on the first-differences of the explanatory variables and their lagged values. The disturbances, ε_t , are supposed to be norm distributed across t with zero mean and variances $\sigma^2 > 0$.

Long-run relationships: Since an ARDL model estimates the dynamic relationship between a

dependent variable and explanatory variables, it is possible to transform the model into a long-run representation, showing the long run response of the dependent variable to a change in the explanatory variables. The standard error of these long-run coefficients can be calculated from the standard errors of the original regression using the delta method. The calculation of these estimated long-run coefficients is given as follows:

With $\phi_i < 0$, there is a long-term relationship between y_t and x_t in the form

$$y_t = \theta_i' x_t + \eta_t \quad (37)$$

where $\theta_i' = \frac{\beta_i}{\phi_i}$ represents the long-run coefficient, and the error terms of the long-term relationship (η_t) are stationary.

Considering the long-term relationship, equation (37) can be written as;

$$\Delta y_t = \phi_i \eta_{t-1} + \sum_{j=1}^{p-1} \lambda_{ij} \Delta y_{t-j} + \sum_{j=0}^{q-1} \delta_{ij} \Delta x_{t-j} + \varepsilon_t \quad (38)$$

The error correction term, η_{t-1} , is derived from the long-term equation (37), and the associated coefficient, ϕ_i measures the speed of adjustment to long-run. By allowing short-term coefficients, intercepts, and error variances in the time series and by constraining long-term coefficients to be identical ($\theta' = \theta$), the mean estimator of the parameters with the maximum likelihood technique, with the likelihood estimators defined as; $\hat{\phi}_i$, $\hat{\beta}_i$, $\hat{\lambda}_{ij}$, $\hat{\delta}_{ij}$, and $\hat{\theta}$

step is to test for ARDL. We test whether the variables are significant in explaining the ROE over the sample period and if so, what are the level of significance? The second aspect is the estimation of the long and short run dynamic coefficients, using the ARDL-cointegrating and long run form. The cointegrating form term is known as the error correction model (ECM) since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments Granger and Engle (1987).

3.4 Estimation Techniques

Based on the above model specification and analytical framework, this study employs the techniques of, ARDL-cointegrating and long run form in estimating the effect of CBN contemporary monetary policy on banks profitability. The estimation technique consists of three steps procedures. The first

More specifically, with a maximum of one lag for the dependent variable and three lag for independent variables, the equilibrium error correction representation of the ARDL (1, 1, 1, 1, 1) model (after a modification of the above stated equations), that is used to justified the long-run and short run empirical analysis in this study and standard Akaike

information criteria (AIC) is used for model selection.

Dynamic Specification of ARDL Cointegrating and Long Run Form

Estimating Equation

$$ROE_t = \omega_0 + \omega_1 ROE_{t-1} + \omega_2 (MPR_t + MPR_{t-1}) + \omega_3 (\log CRR + L \log CRR_{t-1}) + \omega_4 (TBR_t + TBR_{t-1}) + \omega_5 (LQR + LQR_{t-1}) + \omega_6 (EXR_t + EXR_{t-1}) + \beta_7 T_t + u_t \quad (39)$$

Cointegrating Equation:

$$DROE_t = -\omega_1 ROE_{t-1} + \omega_0 + \omega_2 (DMPR_t + DMPR_{t-1}) + \omega_3 (DL \log CRR + DL \log CRR_{t-1}) + \omega_4 (DTBR_t + DTBR_{t-1}) + \omega_5 (DLQR + DLQR_{t-1}) + \omega_6 (DEXR_t + DEXR_{t-1}) + \omega_7 DT_t - \gamma_1 ROE_t - \gamma_2 MPR_{t-1} - \gamma_3 L \log CRR_{t-1} - \gamma_4 TBR_{t-1} - \gamma_5 LQR_{t-1} - \gamma_6 EXR_{t-1} - \gamma_7 T_{t-1} - \gamma_8 EC_{t-1} + u_t \quad (40)$$

The coefficients of interest are both γ and ω , for the long run and for short run error correction equilibrium model (ECEM) (the cointegrating form), the first and second part of the analysis. The data for this study were generated in line with the period covered by the study which is 1980-2014, a period of 35. The data used for this study are obtained from the publications of the Central Bank of Nigeria (CBN) Statistical Bulletin, 2012-2014, Annual Reports on major economic indicators.

4. Analysis of Empirical Results

4.1. Analysis of Estimated ARDL Result

This procedure begins with an autoregressive distributed lag (ARDL) specification of an appropriate lag in equation 39. The consideration of the available degrees of freedom and type of data determine the decision on lag length. Maximum lags were set and lag length was determined by AIC. The

correct lag length in the underlying ARDL is determined to be 1 lag, with annual data, one lag would be long enough. In this study, ARDL estimation does not require pre-estimation tests or pretesting of the data to determine the order of integration. Therefore, the unit root test which involves the determination of the order of integration is not necessary.

We expect as the apriori expectation the parameters MPR and TBR to be less than zero, while Constant, ROE(-1), CRR, LQR and EXR are expected to be greater than zero. To test our hypothesis we used both the probability (p-value) of observing the t-statistic given that the coefficient is equal to zero. For this study we are performing the test at 10% significance level, that is, a p-value that ranges between 0.01 - 0.10 are taken as evidence to reject the null hypothesis of a zero coefficient

Table 1: ARDL Coefficients Result Output

Dependent Variable: ROE				
Method: ARDL				
Dependent lags: 1 (Fixed)				
Dynamic regressors (1 lag, fixed): MPR LOGCRR TBR LQR EXR				
Fixed regressors: C, TREND				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ROE(-1)	0.034153	0.251144	0.135988	0.8932
MPR	1.354467	0.587573	2.305189	0.0320

MPR(-1)	0.215632	0.604201	0.356888	0.7249
LOGCRR	3.347361	1.740412	1.923316	0.0688
LOGCRR(-1)	-0.499000	1.665884	-0.299540	0.7676
TBR	-1.045793	0.506157	-2.066145	0.0520
TBR(-1)	-0.351371	0.554189	-0.634028	0.5332
LQR	-0.082589	0.082883	-0.996453	0.3309
LQR(-1)	0.048758	0.085281	0.571730	0.5739
EXR	0.033391	0.052787	0.632570	0.5342
EXR(-1)	-0.009475	0.050101	-0.189115	0.8519
C	-16.58266	8.861882	-1.871234	0.0760
TREND	-0.294875	0.367690	-0.801967	0.4320
R-squared	0.935203	Akaike info criterion		5.157625
Adjusted R-squared	0.838008	Durbin-Watson stat		2.710349
F-statistic	9.621880	Prob(F-statistic)		0.000141

Source: Authors' Computation

An examination of the ARDL estimated results in Table 1 indicates partial conformity of the results with the postulated theories. The coefficients are not fully in line with our apriori expectation. In the estimated regression line above, the value of the constant term is 16.58288 which means that holding the value of all the explanatory variables constant, the value of banks profitability proxy by return on equity (ROE), will be about 16.58288 Billion naira in a year in Nigeria.

The ARDL estimated results in Table 1 indicates that the past value of the endogenous variable (ROE), the current (short-run dynamic or Analysis) and past values of MPR, the current values of LOGCRR and EXR and past value of LQR(-1) are positively related to the current value of ROE. The result shows that the current value of MPR (1.354) and LOGCRR (3.3474) are significant in determining the current level commercial banks profitability in Nigeria, looking at their p-values. Though ROE (-1)(0.034153), MPR(-1) (0.2156), LQR (-1)(0.048758) and EXR(0.03339) are positively related, there results are not significant in determining the current level of commercial banks profitability having observed the value

of their probability distributions. MPR short-run value did not conformed to the conclusion of some existing studies reported in our literature. This implies that MPR does not affect commercial banks profitability negatively. It maybe as a result of the high lending rate charged by the commercial on every loanable fund.

The ARDL estimated results in Table 1 also shows that the estimated coefficients of the current values of TBR and LQR are -1,0458 and -0.0826 respectively, while, the past value of TBR(-1) and EXR(-1) are -0.3514 and -0.00948 respectively, have negative impact on commercial banks profitability in Nigeria. The result shows that the only current value of TBR is significant in determining the current level commercial banks profitability in Nigeria, looking at their p-values and conformed to our expected sign. The short-run value of LQR and EXR(-1) did not conformed to our expected sign and they equally not significant given the probability distributions.

Table 1 indicates a statistically goodness of fit given by the adjusted R^2 , which is a better measure of goodness of fit, is 0.935. This indicates that approximately 94% variation in our dependent variable is explained by the explanatory variables while, the F-Statistic is

9.621880. Estimated were greater than 3.257 (critical) at that level of significance. The result tends to suggest that the regression equation and the overall fitness are good. The Durbin-Watson (DW) test statistic (d^*) shows no presence of serial correlation between the error terms. From the result d^* is greater than 2, that is $2.710349 > 2$ (the rule of thumb benchmark for negative autocorrelation). This indicates the presence of negative serial correlation.

4.2 Equilibrium-Correction Single-Equation Analysis

The cointegrating form (relations) is known as the Error Correction Term (ECT) since the deviation from long run equilibrium is corrected gradually through a series of partial short run adjustments. Although, the model estimated here is often called an Error Correction Term, technically speaking it is an equilibrium correction model (ECM). The negative coefficient of ECT shows the speed of adjustment annually of the endogenous variables toward equilibrium. The coefficient of the equilibrium correction term (ECT), is

significant, confirming that a long-run (cointegrating) relationship exists between the commercial banks' profitability (ROE) and monetary policy.

The size of this coefficient and its P -value significance level of 1%, implies that adjustment to disequilibria via the equilibrium correction term (ECT) (-0.965847) is relatively quick, as 96.58 percent of a disequilibrium in a given year is corrected in the following year (see first part of Table 2). The ECT appears reasonably well specified judging by the behaviour of the fitted and actual values of the corresponding cointegrating graph between the ROE and CBN monetary policy which is shown in Figure 1.

Also, the short-run properties can be derived from the estimated ECT result shown in the first part of Table 2. In the cointegrating form properties $D(MPR)$, $D(LOGCRR)$ and $D(TBR)$ seem to be significant in describing the short-run dynamics or adjustment of the cointegrated variables towards the equilibrium values of ROE given their P -values and the t -statistic, while, $D(LQR)$ and $D(EXR)$ seem not to be significant given the P -values and the t -statistic.

Table 2: ARDL Cointegrating and Long Run Form

Dependent Variable: ROE				
Selected Model: ARDL(1, 1, 1, 1, 1, 1)				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MPR)	1.354467	0.587573	2.305189	0.0320
D(LOGCRR)	3.347361	1.740412	1.923316	0.0688
D(TBR)	-1.045793	0.506157	-2.066145	0.0520
D(LQR)	-0.082589	0.082883	-0.996453	0.3309
D(EXR)	0.033391	0.052787	0.632570	0.5342
D(@TREND())	-0.294875	0.367690	-0.801967	0.4320
ECT(-1)/CointEq(-1)	-0.965847	0.251144	-3.845790	0.0010
ECT(-1)/Cointeq = ROE - (1.6256MPR + 2.9491LOGCRR - 1.4466TBR - 0.0350LQR + 0.0248EXR - 17.1690 - 0.3053TREND)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MPR	1.625618	0.703151	2.311905	0.0316
LOGCRR	2.949080	1.162997	2.535760	0.0197

TBR	-1.446568	0.627393	-2.305680	0.0320
LQR	-0.035028	0.099288	-0.352789	0.7279
EXR	0.024762	0.036094	0.686043	0.5006
C	-17.169024	9.225362	-1.861068	0.0775
TREND	-0.305302	0.383378	-0.796348	0.4352

Source: Authors' Computation

4.3 Long-Run Steady-State Analysis

Under this ECM procedure, the long run relationship is embedded within the dynamic specification (see 6.2. equilibrium-correction single-equation analysis). The long-run properties or steady-state long-run relationship between ROE and MPR, LOGCRR, TBR, LQR and EXR can be derived from the estimations shown in the second part of Table 2. The table presents the long-run coefficients with their standard errors, *t*-values and probability values extracted from the estimated ECM. With cointegration analysis, the potential endogeneity between the CBN monetary policy and commercial banks' profits does not affect the long-run coefficients.

A look at the regression result in Table 2 indicates conformity of the result with the postulated theories. Looking at the long-run coefficients results, MPR, LOGCRR and TBR maintained significance in describes the long-run dynamics or adjustment of the cointegrated variables towards the equilibrium values of ROE given their *P*-values and the *t*-statistic, as were in the short-run properties. The probability values are given as, 0.0316, 0.0197 and 0.0320 respectively. MPR and LOGCRR, indicate positive associated with banks profitability in the long-run, while TBR indicates negative associated with banks profitability in the long-run

Also, LQR and EXR seem not to be significant given the *P*-values and the *t*-statistic. The probability values are given as, 0.7279 and 0.5006 respectively. LQR indicates

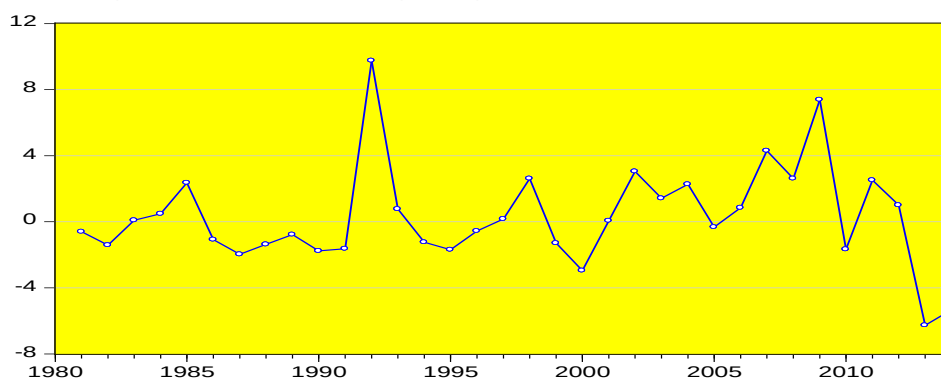
negative associated with banks profitability in the long-run, while EXR indicates positive associated with banks profitability in the long-run.

Importantly, the results in the ARDL coefficients estimate in Table 1 and cointegrating and Long run form in Table 2 show that MPR, LOGCRR and TBR have high impact on bank profitability given the period under review. The elasticity, which is the measure of opportunity cost, are found to be highly significant and given as, 1.354 for MPR, 3.347 for LOGCRR and -1.0458 for TBR in the short-run (see Table 1 and the first part of Table 2), while, 1.6256 for MPR, 2.9491 for LOGCRR and -1.4466 for TBR in the long run (see second part of Table 2). These high impacts implies that these variables are the major contributors to commercial banks profitability in Nigeria. The results show that monetary policy rate, cash reserve ratio and exchange rate annually, will cause a long-run and short run increase on banks profitability, while, treasury bill rate and liquidity ratio annually, will cause a long-run and short run decrease on banks profitability,

4.4 Cointegrating Trend

The variable T_t in equations 35, 39 and 40 explain fairly well the stochastic cointegrating trend of banks profitability as proxy by return on equity (ROE) as shown in Fig 1, which plot the corresponding cointegrating graph for the period 1980 -2014.

Fig 1: Stochastic Cointegrating Trend of ROE(-1) (1980-2014)



This Figure 1 revealed the inconsistency that characterized the Nigerian commercial banks profit with respect to CBN contemporary monetary policy. This stochastic trend is as a result of the changes in the fundamentals (CBN monetary policy). This has implication for the rate of growth of commercial banks' profits as figure 1 shows the stochastic trend or the instability movement in the commercial banks' profit in response to the changes in CBN monetary policy.

5. Policy Implication and Conclusion

The main thrust of this study is examining the monetary policy instruments that determinant bank profitability both in the short and the long run in Nigeria. From our findings or from the analysis carried out, it can be reasonably concluded that not all the Nigerian monetary policy instruments conformed to the theoretical expectations. Therefore, we cannot total agree with the empirical evidence that stated that monetary policy in Nigeria, has adverse effects on corporate profitability of banks and this has invariably, negatively affected the country's march to economic growth and development.

From our empirical evidence, we observed that monetary policy rate, cash reserve ratio and Treasury bill rate have very high significant effects on the level banks of profitability. We observe that monetary policy

rate, cash reserve ratio and exchange rate has positive influence on corporate profit of banks and also observe that treasury bill rate and liquidity ratio has negative influence on corporate profit of banks. This imply that, monetary policy rate, cash reserve ratio and exchange rate annually, will cause a long-run and short run increase on banks profitability, while, treasury bill rate and liquidity ratio annually, will cause a long-run and short run decrease on banks profitability. The positive impact of monetary policy rate on bank profitability (ROE) is not consistent with previous theories on this subject. This may be as a result of high lending rate of the banking sector in Nigeria to cover up for the MPR cost. The implication of this is that the higher the MPR the higher the cost of lending to the investors. Also, this is due to incessant interference by government in Nigeria to control interest rate even in the face of hyper-inflation. From the point of view of the impact of Treasury bill rate, is effective, but its effectiveness is negative on corporate profit of banks.

We can conclude from the findings in this empirical study that their existed a long-run relationship between bank profitability and its major determinants during the period under review. Finally, the model passed the overall statistical test of significance. And the result showed that about 84% variation in bank profitability proxy by return on equity is

explained by all the variables used consequently, we can conclude that some of the variables not all, appeared to be major and important determinants of bank profitability in Nigeria during the period under review and it is important for policy makers to pay more attention to these variable both in the short run and in the long run.

One should note that different policy measures may have different, and often opposite, effects on operational efficiency and technological improvements of banking operations. For instance, although tightening prudential requirements may limit banks' profitability and reduce the operating efficiency in the short run, doing so may encourage banks to look for new and innovative ways to invest, thereby expanding the production-possibilities frontier. It is therefore essential for a policymaker to be able to identify policy instruments that are effective in bringing about changes in productivity and efficiency and come up with the best (often the least-cost) policy response. This is of particular importance for economies in transition, where the choice of instruments for policymakers can be rather limited as well as costly. Furthermore, findings from the study will enlighten the public and the National Assembly on the need to ensure full autonomy of the CBN to enable it perform effectively.

6. Recommendations

Having seen that there exists a long run and short run relationship between bank earnings and explanatory variables through the use of ARDL cointegrating and long run test, and based on the findings, the study therefore recommends that;

- i. Monetary authorities should adopt monetary policies that will help Nigerian deposit money banks to improve on their profitability and there is need to review and strengthen bank lending rate policies through effective and efficient regulation and supervisory framework.
- ii. Banks should improve their profitability through charging moderate lending rates as against maximum rates as their circumstances may allow. Furthermore, the managers of money deposit banks are expected to be able to create the conditions for an efficient banking system devoid of information asymmetry to adapt to changing macroeconomic variables of interest rates and inflation. Banks' management must efficiently manage their portfolios in order to protect the long run interest of profit-making
- iii. The monetary authorities should allow the market to control interest rate especially during inflation.
- iv. Government should encourage banking business in order to avoid illiquidity in the banking sector. By this, government should encourage investment by giving aids to potential investors rather than strangulating banks by much control over interest rate.
- v. CBN should plan legal reserve ratio that will not strangle the banking sector.
- vi. However, emanating from the empirical analysis this study proffered that monetary authority, the Central Bank of Nigeria (CBN) should moderate the minimum policy rate as tool for regulating commercial banks operations and facilitating investment in the economy; the cash reserve ratio should be kept at an optimal level considering its high correlating and negative effect on commercial bank credit; and exchange rate disparity between naira to other international.
- vii. Standard currencies should be well stabilized and bridged in order to encourage private savings and strengthen commercial banks operations in Nigeria.

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