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Monetary Policy and Commercial Banks Assets Quality in Nigeria: Panel Data Analysis

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Abstract
This study examined the effect of monetary policy on assets quality indicator of Nigeria commercial bank soundness from 2009 to 2018. Cross sectional data were sourced from annual reports of commercial banks and Central Bank of Nigeria Statistical Bulletin. Assets quality indicator of commercial banks soundness was used as proxies for the dependent variables while cash reserve ratios, open market operation rates, monetary policy rates, treasury bills rates and money supply were used as proxies for the independent variables. Panel data methodology was employed while the fixed effects model was used as estimation technique at 5% level of significance. Fixed effects, random effects and pooled estimates were tested while the Hausman test was used to determine the best fit. Panel unit roots and panel cointegration analysis were conducted on the study. Findings of the study proved that cash reserve ratio, open market operations rates, monetary policy rates and treasury bills rates have no significant relationship with assets quality indicators of commercial banks in Nigeria. However, Money supply has significant relationship with assets quality indicators of commercial bank soundness in Nigeria. From the findings we recommend that Central Bank of Nigeria should intensify the use money supply as a veritable effective monetary policy tool to achieve bank soundness in Nigeria. Furthermore, CBN should redefine these monetary policy instruments such as open market operation and adjust the monetary policy rate by reducing the cash reserve ratio which will increase liquidity to enable the commercial banks to discharge their lending and investment duties effectively to the public. The cash reserve ratio should be used to complement the open market operations in ensuring that excess liquidity or lack of it in the banking system is minimized. It was further recommended that CBN should look beyond monetary policy in her regulatory governance of commercial banks as most monetary policy tools currently deployed do not have significant relationship with commercial bank soundness indicators within the periods covered in this study.

Keywords: Monetary Policy, Commercial Banks, Assets Quality, Money Supply, Cash Reserve Ratio, Monetary Policy Rate

1. Introduction

The monetary authorities directly influence items of the balance sheet of commercial banks using the direct monetary policy measures. A common feature here is that interest rates are set and credits are allocated by monetary authorities in compliance with the government's economic objective (James and Onyebueke, 2018). In this economic arrangement, the financial system plays no role in the determination of financial prices or returns and allocation of credits (Ajayi & Atanda, 2012). On the other hand, there is sufficient evidence proving a direct relationship between indirect monetary policy and bank assets quality as both of them influence each other. The Nigerian monetary authorities since the mid-1980s recognized the role of free markets by liberalizing of interest rates and the use of indirect monetary policy which are crucial steps towards the development of financial markets. Direct monetary instruments such as selective credit controls, administered interest and exchange rates, credit ceilings, cash reserve requirements and special deposits to regulate the banking system were employed before the financial reforms of 1986. The fixing of interest rates at relatively low levels was done with the promotion of investment and growth in mind. Sometimes the monetary authorities would impose special deposits to reduce the amount of excess reserves and credit creating capacity of the banks (Uchendu, 2009 &Okafor 2009). In the words of Ologunde, Elumilade, & Asaolu (2006), interest rate along with monetary aggregates formed targets of monetary policy in Nigeria.

The idea that monetary policy shocks are an important source of banking crises raises questions about the appropriate framework for monetary policy, bank regulation and supervision in Nigeria as empirical evidence has shown that good monetary policy promote banking system soundness while monetary policy shocks affect negatively the soundness indicators such as liquidity, asset quality and earnings, thus banking soundness should be treated as an objective of monetary policy just as price stability, full employment economic growth and balance of payment. For instance, theory suggests that a shock to the monetary base should expand aggregate demand by reducing bank rate and depreciating the currency. To regulate monetary policy in the Nigerian economy, the Central Bank of Nigeria (CBN) employs various instruments which include; Open Market Operation (OMO), Reserve Requirement (RR) and monetary policy rate. Onoh (2007) noted that the conduct of monetary policy in Nigeria is characterized with poor implementation, ill timing and policy inconsistency, for instance the foreign exchange market have over 20 different policies in less than 10 years, and some of the policies are re-introduced after being abolished. It is therefore relevant to examine the effect of monetary policy on commercial bank soundness in Nigeria.

Despite the numerous studies on the effect of monetary policy and bank assets quality results remain controversial and inconclusive as some found that monetary policy has no significant effect on financial fragility while others found that financial stability is a linear function of bank procyclicality of bank lending (Toby, 2006; Toby, 2014; Toby, 2008). Again, the variables used in existing literatures are aggregate data from the banking industry; this creates a knowledge gap on the effect of various components of monetary policy and bank soundness indicators. From the above knowledge gap and research problem, this thesis intends to examine the extent to which various instruments of monetary policy affect commercial banks assets quality in Nigeria.

2. Literature Review

Asset Quality

Asset quality is used to assess the strength of a bank and is directly linked to capital adequacy because insolvency risk is accompanied by the deterioration of the bank's assets (IMF and World Bank 2005). Following prior studies, we use the ratio of loan loss provisions to total loans (LLPTL), the ratio of loan loss provisions to net interest income (LLPII), and the ratio of total loans to total assets (TLTA), LLPTL represents the proportion of risky loans to total loans that were granted to the borrowers. LLPII indicates the ability of a bank to use the received interest income in order to cover the expenses caused by provisions for impaired loans. Accordingly, the lower value of LLPTL or LLPII, the better the quality of loans is. Also, a higher TLTA reflects the more sensitivity of assets structure to loan losses since loans represent the most important components of a bank's assets (Le 2016). Thus, the highest rank is attributed to a bank that has registered the lowest value of these indicators.

Monetary Policy

Monetary policy is defined by the Central Bank of Nigeria (CBN) as a combination of measures designed to regulate supply and cost of money in an economy, in consonance with the level of economic activities. Odufalu, (1994) defined monetary policy as the combination of measures taken by monetary authorities (the CBN and the ministry of Finance) to influence directly or indirectly both the supply of money and credit to the economy and the structure of interest rate for economic growth, price stability and balance of payment equilibrium. Onyido, (1993) sums it up when he said that monetary policy is therefore applied to influence the availability and cost of credit in order to control the money supply policy. He generally describe the action taken by the Central Bank as using tools / instrument at its disposal to influence monetary conditions in particular, the quantity and supply of money in the economic growth.

Folawewo and Osinubi (2006) defined monetary policy as a tool designed to control the supply, volume and cost of money in the circulation in line with predicted economic activities. Monetary policy is concerned with discretionary control of money supply by the monetary authorities (Central Bank with Central Government) in other to achieve stated or desired economic goals. Governments try to control the money supply because most governments believe that its rate of growth has an effect on the rate of inflation espoused by the quality theory of money. Hence monetary policy comprises those government actions designed to influence the behavior of the monetary sector.

Monetary Policy is essentially the tool for executing the mandate of monetary and price stability. Monetary policy is essentially a programme of action undertaken by the monetary authorities generally the central bank, to control and regulate the supply of money with the public and the flow of credit with a view to achieving predetermined

macroeconomic goals (Dwivedi, 2005) goals of full employment, price stability, external balance and economic growth.

Monetary Policy Instruments

Monetary policy instruments used under indirect control regime have evolved over the years with the monetary authority time-turning than as dictated by trends in the economy especially the overall money aggregates, such major instruments are;

Open Market Operation

It refers to the purchase, sale of government securities including the CBN for the purpose of increasing or reducing the money supply. Open Market Operation expands monetary base, thereby raising the money supply and lowering short term, interest rates. In 2002, the CBN introduced another monetary instrument known as the CBN certificate to compliment the use of government security for conduction of open market operation (CBN Guideline 2002). The CBN certificate is different from other instrument in the sense that, it cannot be discounted for this is to enhance the efficiency of monetary policy actions, given the instability of the only available treasury. In terms of impact, the sales and purchase of CBN certificate has the same impact as the sales and purchase of other government securities. The OMO bill have maturity period of 30 to 60 days to be issued on the basis of need based on the Dutch auction system and targeted at the authorized deals only (CBN 2002). Equally, Open Market Operation (OMO) will be conducted weekly in the secondary market, mainly in short term government securities of carrying maturities, or in order to meet the various preferences of participant in the market. OMO will be complimented by reserve requirements and discount window operation including Re-purchase Agreement (REPOS) while discount houses will continue to play the role of principal dealer in the market (CBN Guideline 2002/2003)

Monetary Policy Rate

It refers to the rate CBN lends to deposit money banks in forming its rate as a lender of last resort. It primarily involves changes in the discount rate (for minimum rediscount ratio MRR) and affects the volume of loans to the banks, and to monetary base and expand the money supply, a fall in discount rate reduces the monetary base and reduce the money supply. The CBN facility at which discount loans or discounts are made to banks is called the Discount Window. The MRR is also used to influence the level and direction of other rates determines whether the deposit money bank is adopting a policy of monetary ease or monetary restraint. The MRR is currently fixed at 11.5 percent (Balogun, 2007).

Cash Reserve Ratio

The reserve requirement (or cash reserve ratio) is a central bank regulation that sets the minimum fraction of customer deposits and notes that each commercial bank must hold (rather than lend out) as reserves. These required reserves are normally in the form of cash stored physically in a bank vault (vault cash) or deposits made with a central bank. The required reserve ratio is sometimes used as a tool in monetary policy, influencing the country's borrowing and interest rates by changing the amount of funds available for banks to make loans with. Western central banks rarely alter the reserve requirements because it would cause immediate liquidity problems for banks with low excess reserves; they generally prefer to use open market operations (buying and selling government-issued bonds) to implement their monetary policy (Chodechai, 2004).

Theoretical Review

Joseph Schumpeter Theory Financial Fragility

Joseph Schumpeter (1961) developed a model with a boom-bust cycle which can also lead to a financial crisis. Starting from an equilibrium situation some entrepreneurs start with an innovation (a new technology, a new product, a new organization). A stock of inventions is always available. It is the entrepreneur which selects some of them and triggers economic development, entrepreneurship, which is very close to the Keynesian category of animal spirits (Keynes 1936), plays the key role during an expansion process. According to Schumpeter, capitalist development cannot take place without credit. Credit is created ad hoc (out of nothing) (Schumpeter 1911) by the banking system and gives the entrepreneur the financial power to get the physical inputs to implement the innovation. The essential function of credit in our sense consists in enabling the entrepreneur to withdraw the producers' goods which he needs from their previous employment, by exercising a demand for them, and thereby to force the economic system into new channels.

Schumpeter (1911) Schumpeter then assumes a kind of herding behaviour of firms following the innovative entrepreneurs. The followers imitate the innovation to get some of the extra profits which can be earned in the new market. They are also forced to do so by competition. If they do not follow they will sooner or later be eliminated by the market. Driven by high investment and credit expansion a boom phase develops which at a certain point comes to end and gives way for a contraction. This expansion phase, where firms invest into the new innovation or take credit to reorganize and get more productive is accompanied by a second, often bigger and more visible phenomenon. Prosperity is accompanied by speculation. Companies speculate on the further expansion and increase orders and inventory. Speculation in the narrow sense may occur and lead to a bull market. Private households may take consumption loans, etc. The general expansion also leads companies to increase capacities (without increasing productivity) in anticipation of continuing high demand.

Irving Fisher Financial Fragility Theory

Irving Fisher (1911**)** is the founder of the modern version of the quantity theory of money which was set out by David Hume and taken over by David Ricardo and almost all classical economists. Fisher argues, following the classical and neoclassical paradigm that in the long run money is neutral and changes of money supply in the end only affect the price level. But what is important here is that changes in the money supply can have deep and destabilizing effects on the economy in the short and medium term. In the short term, money is anything else but neutral. Periods of "transition" from one equilibrium to another after an increase in the supply of money leads to "action and reaction" and "a cycle of 'prosperity' and 'depression (Fisher 1911). Later Milton Friedman (1968) argued in exactly the same way. Also for him, money can become a fundamentally disturbing factor for the real economy. His recommendation to follow strict monetary targeting as an economic policy rule had the purpose of enforcing the neutrality of money. For the older versions of the classical and neoclassical paradigm we can sum up: In spite of the hypothesis of the long-term neutrality of money the latter can become a fundamentally disturbing factor for the economy. Asset price bubbles and financial crisis are extreme versions of such destructive disturbances created in the monetary sphere.

Asymmetry Information Theory of Financial Fragility

There are two polar views of the nature of financial crises in the literature. Monetarists beginning with Friedman and Schwartz (1963) have associated financial crises with banking panics. They stress the importance of banking panics because they view them as a major source of contractions in the money supply which, in turn, had led to severe contractions in aggregate economic activity in the United States. Their view of financial crisis leads monetarists to advocate a lender-of-last-resort role for the central bank, so that banking panics and the subsequent monetary instability will be prevented. Events in which there is a sharp drop in wealth but no potential for a banking panic and a resulting sharp decline in the money supply are not seen by monetarists as real financial crises that require any central bank intervention. Indeed, Schwartz (1986) characterizes these situations as pseudo financial crises.

Commercial Loan Theory

The essence of the theory is that short term loans are preferred by commercial banks as they will be repaid from the proceeds of transactions they facilitate and finance. A proposition that has been immensely subjected to criticism Dodds (1982) and Nwankwo (1992). Its antagonists argue that the theory is a deterrent to economic development especially for developing countries like Nigeria that require huge long term funds to provide a big push for development. The commercial loan or the real bills doctrine theory states that a commercial bank should forward only short-term self-liquidating productive loans to business organizations. Loans meant to finance the production, and evolution of goods through the successive phases of production, storage, transportation, and distribution are considered as self-liquidating loans.

This theory also states that whenever commercial banks make short term self-liquidating productive loans, the central bank should lend to the banks on the security of such short-term loans. This principle assures that the appropriate degree of liquidity for each bank and appropriate money supply for the whole economy. The central bank was expected to increase or erase bank reserves by rediscounting approved loans. When business started growing and the requirements of trade increased, banks were able to capture additional reserves by rediscounting bills with the central banks. When business went down and the requirements of trade declined, the volume of rediscounting of bills would fall, the supply of bank reserves and the amount of bank credit and money would also contract.

Empirical Review

Tsomocos (2013) developed a general equilibrium model of an economy with incomplete markets (GEI) with money and default. The model is a simplified version of the real world consisting of a non-bank private sector, banks, a central bank, a government and a regulator. The model is used to analyze actions by policy makers. The key analytical results are: a financially fragile system needs not collapse; efficiency can be improved with policy interventions. A system with heterogeneous banks is more stable than one with homogeneous ones. In the Tsomocos model, existence of monetary equilibria allows for positive default levels in equilibrium. It also characterizes contagion and financial fragility as an equilibrium phenomenon. Tsomocos defines financial fragility as a phenomenon in which aggregate profitability of the banking sector declines and defaults in the non-bank and banking private sectors increase. Thus, equilibria with financial fragility require financial vulnerability in the banking sector and liquidity shortages in the non-bank private sector.

Goodhart *et al* (2016) provided a tractable model which illuminates problems relating to individual bank behaviour, to possible contagious interrelationships between banks, and to the appropriate design of prudential requirements and incentives to limit 'excessive' risk-taking. Among other results, a non-trivial quantity theory of money is derived, liquidity and default premia co-determine interest rates, and both regulatory and monetary policies have non-neutral effects. The model also indicates how monetary policy may affect financial fragility, thus highlighting the trade-off between financial stability and efficiency.

Lagunoff and Shreft (2011) presented a dynamic stochastic game-theoretic model of financial fragility. The model has two essential features. First, inter-related portfolios and payment commitments forge financial linkages, among agents. Second, the shocks to investment projects' operations at a single date cause some projects to fail. Investors who experience losses from project failures reallocate their portfolios, thereby breaking some linkages. In the Pareto-efficient symmetric equilibrium studied, two related types of financial crises can occur in response. One occurs gradually as defaults spread, causing even more links to break. An economy is more fragile ex-post the more severe this financial crisis. The other type of crisis occurs instantaneously when forward-looking investors preemptively shift their wealth into a safe asset in anticipation of the contagion affecting them in the future. An economy is more fragile ex ante the earlier all of its linkages break from such a crisis.

Detragiache (2012) presented a model of a small open economy with a fragile banking sector and imperfect international capital mobility. In the model, increased international integration of the market for bank deposits makes bank runs more likely, resulting in a welfare loss for the business sector. Bank depositors may gain or lose depending on the parameters, when depositors gain, whether the gains exceed the losses to the business sector or not depends on the size of the holdings of foreign assets relative to the deadweight costs of bank runs. Thus, limited international financial integration may not be desirable.

Devries (2015) provided a model in which banks are linked through the interbank deposit market participations like syndicate loans and deposit interest rate risk. The similarity in exposures carries the potential for systemic breakdowns. This potential is either strong or weak depending on whether the linkages remain or vanish asymptotically. It is shown that the linearity of the bank portfolios in the exposures, in combination with a condition on the tails of the marginal distributions of these exposures, determines whether the potential for systemic risk is weak or strong. The study shows that if the exposures have marginal normal distributions the potential for systemic risk is weak, while the potential is strong if the student distributions apply.

Proto (2017) analyzed a model of bank fragility and growth expectations. Banks supply liquidity to insure individuals against possible short-term consumption shocks. The higher this level of illiquidity insurance the lower the investments in long-run assets, and the higher the risk of a bank run generated by a real negative shock. If individuals are sufficiently risk-averse, competitive banks trade off liquidity insurance for portfolio risk. High growth expectations, typical of emerging economies, increase the risk of a bank run. On the contrary, deposit contracts offered when economic performances are very uncertain (like in less developed economies), and where output fluctuations are milder (like in developed economies), are less exposed to the risk of a bank run. In this setting, a bail-out in case of crisis is ex-ante Pareto efficient even if it always increases the risk of crisis.

Giuseppe and Brasil (2016) have studied the degree of exposures of European banks to common shocks over time. The study adopted a measure of co-movements in bank risk by means of a dynamic factor model, which allows us to

decompose an indicator of bank fragility, the Distance-to-Default, into three main components: an EU-wide, a country-specific, and a bank-level idiosyncratic component. The results show that commonality in banks appears to have significantly increased. It is also found that co-movements in EU banks' fragility are only in part related to common macro shocks and that a banking system specific component at the EU-wide level appears relevant.

Moheeput (2018) considers banking panic transmission in a two-bank setting, in which the main propagator of a shock across banks is the informational channel. Banks are perceived to be positively connected to some unobserved macroeconomic fundamentals. The game takes a dynamic Bayesian setting with depositors of one bank making their decision to withdraw after observing the event in the other bank. The study shows that, if this panic event is used for Bayesian inference about the state of the common macroeconomic fundamental, then, in the equilibrium profile of the game, contagion and correlation both occur with positive probability, with contagion modeled as a state-contingent change in the cross-bank correlation. Such endogenous characterization of probabilistic assessments of contagion and correlation has the appealing feature that it enables us to distill between these two concepts as equilibrium phenomena and to assess their relative importance in given banking panic transmission setting. The work also shows that contagion is characterized by public informational dominance in depositors' decision set.

Nikolaidi (2019) developed a post-Keynesian model with Minskyan insights that places emphasis on the interaction between the banking sector and the real economy and investigates the conditions under which the latter is likely to be brought into financial fragility. The analytical framework used to describe the banking sector explicitly incorporates the impact of banks' 'animal spirits', of firms' credit-worthiness and of banks' expectations on the provision of loans. The financial fragility of the economy is defined by drawing on Minsky's taxonomy and is assumed to rely both on the fragility of firms and on the fragility of the banking sector. The dynamic analysis investigates how the interaction between the fragility ratio of the banking sector and the real output can generate financial structures that are susceptible to financial fragility.

Ghosh (2010) examined interconnect among credit growth, bank soundness and financial fragility. The analysis appears to indicate that higher credit growth amplifies bank fragility. Besides, the results point to the fact that sounder banks increase loan supply. In terms of ownership, the evidence testifies that credit growth has been rapid in state-owned and de novo private banks. In terms of policy implications, the analysis appears to suggest the need for giving priority to risk-based supervision as a way to contain the potential risks associated with rapid credit growth.

Kasselaki and Tagkalakis (2013) studied the links between financial soundness indicators and financial crisis episodes for several macroeconomic and fiscal variables in 20 OECD countries. The key findings suggest that, in times of severe financial crisis, regulatory capital to risk-weighted assets increase, non-performing loans (NPL) to total loans increase dramatically but loan loss provisions lag behind NPLs and profitability deteriorates dramatically. Ruiz-Porras (2009) showed that banking stability is enhanced in market-based financial systems, whilst financial development reduces it. An earlier study has provided "stylized facts" between financial systems and banking crises (a Ruiz-Porras, 2006). Concretely, it shows that crises are more likely in bank-based financial systems and that financial development enhanced banking stability. Moyo *et al* (2014) found that the Sub-Saharan Africa (SSA) financial system is bank-based and weakly contestable, therefore, any systemic bank failures would have serious contagious repercussions in these economies. It is also found in the study that bank-specific, macroeconomic and institutional factors are important in predicting episodes of bank distress in Sub-Saharan Africa.
Ashraf and Tariq (2016) conducted a study on evaluating the financial soundness of listed Pakistani banks in light of Bankometer and Z-score model. Soundness of each bank was computed separately to evaluate the stability of listed Pakistani banks for the period 2006-2014. Although there existed slight differences, both models reported almost same results classifying Bank of Punjab into grey zone. The study suggested that Bank of Punjab's financial soundness is not that much satisfactory and more improvement is required to secure super sound bank status.

Uddin, Masud and Kaium (2015) conducted a study to measure the financial soundness of selected private commercial banks of Bangladesh covering the period of 2006-2010. In this study different statistical tools and financial indicators were used to analyze the financial soundness of selected banks. However, the study revealed upward trends during the period of 2006-2010 using different financial indicators and made a rank of the selected commercial banks. It was found from the study that a bank with higher deposits, loans, investments, branches and employees does not always show better profitability. The study also recommended some measures that could be implemented by banks to ensure soundness in their operation.

Kattel (2015) evaluated the Financial Solvency of Selected Commercial Banks of Nepal using application of Bankometer covering the period 2007- 2012. The study found that all the private and joint venture banks are in sound financial position and private sector banks are financially sounder in comparison to joint venture banks. The study also concludes that this recent model for financial soundness measurement will help the bank's internal management in mitigating the insolvency issues by proper control and supervision system at the operational level.

Qamruzzaman (2014) tried to predict bankruptcy of selected private commercial Banks in Bangladesh using Bankometer's S-score and Altman "Z-score" model. For analyzing the financial position of banks the researcher took 20 banks as sample from 30 listed private commercial banks in Dhaka Stock. His study found that both Bankometer's S-score and Altman Z-score show similar results about financial position in year 2008, 2009 and 2010 but exceptions prevail in year 2011 and 2012. Although, Altman Z-score model shows slightly bankruptcy status but S-score model shows as a whole banking industry hold a very healthy financial status according to his study.

Anita,Ubud SyafieIdrus and Djumahir (2013) used different models namely CAEL, Zscore and Bankometer for assessing financial performance of P.T Bank Papua covering the period 2003-2011. His study shows that both CAEL and Bankometer have revealed same assessment in determining financial position but Altman's Z-score model has reversely put Papua banking industry in to gray zone. This research also suggested that Z-score model is not suitable for evaluation of banking industry having some limitations. However, the study concluded that Z-score model provides early indication about bankruptcy in assessing financial performance and based on the results of above mentioned three models; Bank Papua's profitability is good.

Makkarand Singh (2012) attempted a study with a model named Bankometer to evaluate the solvency of 37 Indian commercial banks covering the period of 2006-07 and 2010-11.The researcher used Bankometer to check whether analyzing the vulnerability of financial distress on the banks is better than the conventional methods like CAMELS and CLSA Stress test. His study found that all the Indian banks are financially solvent and also revealed that private sector banks are financially more sound than public sector banks. This study also identified some unperformed banks and also concluded that Bankometer model will assist internal management in avoiding insolvency issues.

Arulvel and Balaputhiran (2013) initiated a study of financial performance analysis on banking sector of Sri Lanka. The study covered the period 2006-2010 and assessed financial performance of private and state owned banks by applying different statistical tools like Data Environmental Analysis, CAMELS and Bankometer. The study found that state owned banks are performing better than the commercial banks as per Bankometer approach.

Shar, Shah and Jamali (2010) evaluated the performance of banking sector in Pakistan using a new model named Bankometer model which is recommended by IMF. In this study the model Bankometer has been applied on individual banks covering the period 1999-2002 for evaluating the solvency of each bank in Pakistan. The results have been compared with CAMEL and CLSA-stress test for conducting better comparison. His study concluded that Bankometer's score scale can be applied at global level to predict the vulnerability of an individual bank.

Roman and Şargu (2013) using Romanian data show that the largest banks may have strengths in some parameters of CAMELS approach but have weaknesses in others. In addition, several studies have investigated which parameters of CAMELS approach are used to predict bank failures. Gilbert, Meyer and Vaughan (2000) suggest the set of explanatory variables that include net worth, return on assets, size and securities roughly correspond to those verified in bank failures.

Henebry (1997) demonstrates the ratios that involve capital to total assets, non-performing loans to total loans, and total loans to total assets are the only three-time stable predictors of bank failures. All in all, these findings suggest that some variables have less reliable predictive power compared with other variables and some degree of interchangeability is possible within a category of indicators (Derviz & Podpiera 2008). In the literature, there is the increasing number of studies that have attempted to analyze the performance of Vietnamese banking system. Most studies use the economic frontier approach.

Nguyen, Roca and Sharma (2014) find that SOCBs were more cost and profit efficient than POCBs. These findings are in line with the findings of Vu and Turnell (2010) who found that there was a advantages of the economic frontier approach over the financial ratios are discussed in Berger, Hunter and Timme (1993) and Nguyen, Roca and

Sharma (2014). Significant gap in allocative efficiency between SOCBs and other types of banks and POCBs were least profit efficient.

Le (2017b) analyzed the efficiency effect of three merger cases in Vietnamese banking system. His results reveal that the efficiency improved in the majority of merger cases and was not related to acquiring bank's efficiency advantage over its targets. Small and-medium POCBs should be promoted in future mergers and acquisitions as a means to enjoying efficiency gains. Similarly, Le (2017a) suggests that SOCBs are considered as the main drag for system's performance, thus the future bank mergers and acquisitions that include a SOCB should be approached with caution.

Abdul Kaium Masud and Mahbubul Haq (2016) analyzed the financial performance of the select banks by measuring branch expansion and employment generation. It was concluded that all the select banks had positive result in these two factors. Irina, Raluca Badea and Gheorghe Matei (2015) measured both initial model and the revised model to examine the financial soundness. The result outline the evolution of the financial stability for decision making and it helps to improve the techniques for monitoring and managing risks. Parul Chotalia (2014) evaluated the financial health and soundness of the select private sector bank. Result shows that all the select banks are required to improve their financial performance to avoid bankruptcy.

Roli Pradhan (2014) adopted Z score to predict the Z score value for the future period. The study concluded that the Z score of Oriental Bank of Commerce has the highest value among the above mentioned three banks. The banks condition was improved from 2011 onwards. Matias Costa Navajas and Aaron Thegeya (2013) studied the financial soundness indicators and banking crises. It showed that the lack of return on equity was a leading indicator of banking crises.

Daniela zapodeanu and Mihailioancociuba (2010) examined a financial soundness indicators proposed by IMF. The result showed that the main indicators of the financial soundness were Assets, loans, return on equity, profit and market share. A handful of studies have been done on the South African banking sector. These studies are of two strands: one strand looked at the competitive settings in the sector whilst another group analyzed efficiency conditions.

Ncube (2019) used stochastic frontier analysis to calculate cost and proof efficiency of four large and four small banks in South Africa for the period 2000 to 2005. His results show that banks are generally 85% cost efficient with Investec being the most efficient bank whilst Standard bank was the least. Proof efficiency levels were relatively lower at 55% for the banking sector with the most proof efficient banks being Capital and standard bank with Ned bank and Absa being the least. Using the Krusral-Wallis ANOVA tests, he found that there has been a significant change in cost efficiency between these periods but no change in proof efficiency.

Erasmus and Makina (2014) analyzed technical efficiency in the South African banking sector using the largest banks. They used standard and alternative approaches to Data envelope analysis (DEA) and for the period before and after the financial crisis, that is 2006 to 2012. Their results show that Barclays bank and Ned bank were the most technically efficient banks using the two approaches and they conclude that the global financial crisis did not have a significant impact on the technical efficiency of the major banks in South Africa.

Erasmus and Makina (2014) were contrary to those obtained by Maredza and Ikhide (2013). Using data for four largest commercial banks for the period 2000 to 2010 and calculating total factor productivity or efficiency using DEA ís Hicks-Moorsteen index, Maredza and Ikhide (2013) found technical efficiency scores to have been ejected by the financial crisis. Results from their stage two Tobit model showed that efficiency was 17% lower during the crisis compared to the pre-crisis period.

Mlambo and Ncube (2011) carried out another study on South African banks where they analyzed the evolution of competition and efficiency of 26 banks between the periods 1999 to 2008. Using DEA for measuring technical, allocative and cost efficiency and the Panzar Rose model for estimating competitive conditions, they found that even though the number of efficient banks was falling, average efficiency was increasing and the banking industry was monopolistic in nature.

Simbanegavi et al (2015) also tested for competition in the South African banking sector employing the Panzar Rose and the Bresnahan models and using a dataset of 14 banks over the period 1998 to 2008. They found the banking sector to be monopolistic in nature using the Panzar Rose model but could not reject the null hypothesis for perfect competition using the alternative Bresnahan approach. They conclude that these findings suggest that even though the banking sector is highly concentrated this has not erected competition in the sector. It appears that studies that have analyzed the competitiveness of the South African banking sector using the Panzar Rose methodology arrive at the same conclusion.

Simatele (2015) also used a time varying Panzar Rose methodology to examine the relationship between bank structure and competition in South Africa for the period 1997 to 2014. Using a dataset of 35 banks, she also found the sector to be monopolistically competitive conforming the results found by Mlambo and Ncube (2011) as well as Simbanegavi et al (2015). In Africa, a number of studies have also investigated the relationship between competition and efficiency using various competition and efficiency measurement techniques and finding mixed results. Sarpong-Kumankoma et al (2017) looked at competition and bank efficiency in SSA, employing Stochastic Frontier Analysis (SFA) finding results inconsistent with the quiet life hypothesis. They found that increase in market power leads to greater bank cost efficiency, but the effect is weaker with higher levels of financial freedom.

Hope et al (2013) using ten African countries and they found that there is a robust positive relationship between market power and financial stability. This result suggests that there is a trade-off between bank competition and financial sector stability in these African countries, as per the competition-fragility view. Studies on the relationship between competition and efficiency in the banking sector in non-African countries also abound. Most of these studies use granger causality tests to analyze the relationship between competition and efficiency. They only differ in the way they measure efficiency, one group of this literature uses Data Envelope Analysis (DEA) whilst another employ Stochastic Frontier Models (SFA). They all measure competition using non-structural measures like Panzar Rose H-statistics, Lerner index and the Boone indicator. Regardless of the efficiency technique used, there is no consensus on the nature of relationship between efficiency and competition.

Rahim (2016) used Malaysian commercial banking sector found the same relationship as Schaeck and Cihak (2008) who used European and US banks. Rahim found a positive effect of competition on technical efficiency whilst Schaeck and Cihak found competition to be positively related to both proof and cost efficiency. Using Stochastic Frontier Analysis, Fungacova et al (2013) studied whether bank competition is detrimental to efficiency in China using data for the period 2002-2011. Their finding is inconsistent with the quiet life hypothesis that market power has a negative impact on cost efficiency.

Rahman (2017) applied the Bankometer Model to assess the financial soundness of twenty-four purposefully selected private commercial banks in Bangladesh during the period 2010 to 2015 and concluded that all the banks at the time were in sound financial health. There was no attempt, however, in the study to determine whether or not there could have been a different result if the banks had been public, rather than private.

Ogbulu and Torbira (2012) investigated the empirical relationship between measures of monetary policy and the bank asset (BKA) channel of the monetary transmission mechanism as well as the direction of causality between them. Using data for the period 1970-2010 and employing co-integration, error correction mechanism and variance decomposition techniques, the study found a positive and significant long run relationship between BKA, money supply (MNS), cash reserve ratio (CRR) and Minimum Rediscount Rate (MRR) as well as uni-directional Granger causality from BKA and CRR to MNS respectively. The results of the variance decomposition of BKA to shock emanating from CRR, MRR and MNS show that own shocks remain the dominants source of total variations in the forecast error of variables. The authors recommend that monetary policies should be properly fashioned to accomplish their target objectives in the economy.

Pastory & Mutaju (2013) analyzed the relationship between the capital adequacy and asset quality of commercial the banks in Tanzania. The study employed Panel secondary data from 33 banks in the period (2006-2011) and the linear Regression model was used to test for the relationship between the two variables. The findings indicate that capital adequacy has a great influence on the asset quality. The increase in capital ratios has sometimes reduced the asset quality productivity and in most cases the levels of non-performing loans and non-performing asset have been increased with the increase in capital ratios. CAMELS analysis indicated the banks financial position to be stable and meet the regulatory requirements. It has been recommended that the bank of Tanzania (BOT) should foster their

strength in supervision as the two categories have been viewed to be very crucial and do increase the stability of the banking system.

Younus and Akhta (2009) examined the significance of statutory liquidity requirement (SLR) as a monetary policy instrument in Bangladesh. Using descriptive analysis techniques, they found that statutory liquidity requirement has experienced infrequent changes and past evidence showed that reduction in SLR produced positive impact on bank credit and investment especially prior to the 1990s. SLR and Cash Reserve Requirement (CRR) were found to be significant tools of reducing inflation and both are used only in situation of drastic imbalance resulting from major shocks. They posited that Bangladesh Bank has used open market operations (OMO) more frequently rather than changes in the Bank Rate and SLR as instruments of monetary policy in line with its market oriented approach.

3. Methodology

This study adopted quasi-experimental research design to examine the relationship between monetary policy and commercial banks' assets quality in Nigeria. The data was panel time series collected from the Central Bank of Nigeria statistical bulletin and financial statement of commercial banks in Nigeria.

Model Specification

The following models are specified to achieve the objectives of this study:

$$AQI = \beta_0 + \beta_1 CRR + \beta_2 OMO + \beta_3 MPR + \beta_4 TBR + \beta_5 MS + \varepsilon_i \qquad 1$$

Where:

AQI= Assets quality indicators
CR = Cash reserve ratio
OMO = Open market operation
TBR = Treasury bill rate
MPR = Monetary policy rate
MS = Money supply proxy by growth of M2
β_0 = Regression Intercept
$\beta_1 - \beta_6$= Coefficient of the Independent to the Dependent Variables

Table 1: Variables and A-priori Expectations

Variable	Measurement	Notation	Expected Relationship
Assets quality indicator	The ratio of loan loss provisions to net interest income	AQI	Dependent variable
Cash reserve ratio	minimum fraction of customer deposits that each commercial bank must hold	CRR	+
Open market operation	Monetary value of money market instrument hold by commercial banks to total bank assets	OMO	+
Monetary policy rate	The rate CBN lends to deposit money banks	MPR	+
Treasury bill rate	The rate which CBN sells and discount treasury bills to commercial Banks	TBR	+
Money supply	Growth rate of broad money supply	MS	+

Techniques of Data Analysis

The study adopts the panel data method of data analyses which involve the fixed effect, the random effect and the Hausman Test. The technique used in this study is the Ordinary Least Square (OLS) estimation technique. The test instruments in the OLS are the T-statistics and F-test which were used to test the significance of variables and the overall significance of the regression respectively. Other test instruments also employed were the Durbin Watson test which was used to test the presence or absence of auto correlation between and among the explanatory variables and the adjusted R-square used to test the percentage variation of the dependent and the independent variables.

To achieve the stated objective, the collected time series data will be analyzed using descriptive statistics, correlation matrix and multiple linear regression analysis. The descriptive statistics (Mean values and standard deviations) will be used to analyze the general trends of the data from 2009-2018 based on the sample of 14commercial banks. The rational for choosing OLS is that, if the Classical Linear Regression Model (CLRM) assumptions 5 hold true, then the estimators determined by OLS will have a number of desirable properties, and are known as Best Linear Unbiased Estimators (Brooks 2008). In addition, as noted in Petra (2007) OLS outperforms the other estimators when the following holds; the cross section is small and the time dimension is short.

(i) Coefficient of Determination (r^2) Test – this measures the explanatory power of the independent variables on the dependent variables. For example, to determine the effect of monetary policy on commercial bank soundness, we used the coefficient of determination. The coefficient of determination varies between 0.0 and 1.0. A coefficient of determination says 0.20 means that 20% of changes in the dependent variable is explained by the independent variable(s).

(ii) F-Test: This measures the overall significance. The extent to which the statistic of the coefficient of determination is statistically significant is measured by the F-test. The F-test can be done using the F-statistic or by the probability estimate. We use the F-statistic estimate for this analysis.

(iii) Student T-test: measures the individual statistical significance of the estimated independent variables. At 5% level of significance.

(iv) Durbin Watson Statistics: This measures the colinearity and autocorrelation between the variables in the time series. It is expected that a ratio of close to 2.00 is not auto correlated while ratio above 2.00 assumed the presence of autocorrelation.

(v) Regression coefficient: This measures the extent in which the predictor variables affect the dependent variables in the study.

(vi) Probability ratio: It measures also the extent in which the predictor variables can explain change to the dependent variables given a percentage level of significant.

Pooled Regression (OLS) Model (PRM*)*: is equally known as the constant coefficient model (CCM). It is the simplest among the three models in panel data analysis. However, it disregards the space and the time dimensions of the pooled data. In a situation where there is neither significant cross-section unit nor significant temporal effects, one could pool all of the data and run an ordinary least squares (OLS) regression model.

Fixed Effects (FE) Model: in the FE technique, the slope coefficients, are constant but the intercept, varies across space i.e. the intercept in the regression model is allowed to vary across space (individuals). This is as a result of the fact that each cross-sectional unit may have some special characteristics. The FE technique is very suitable in cases where the individual specific intercept may be correlated with one or more regressors (independent variables). In order to take into cognizance of different intercepts, the mean differencing or dummy method is usually employed based on which is found more suitable. It is known as the least-squares dummy variable (LSDV) model in cases where dummy variables are used. This is another way of calculating within estimate, most especially when the number of observations (*N*) is not relatively large. The major disadvantage of the LSDV model is that it significantly reduces the degrees of freedom when the number of cross-sectional units, *N*, is very large. In this case, *N* number of dummies is introduced, which will help to reduce the common intercept term. We stipulated that the error term should be independently and normally distributed with zero mean and constant variance and more importantly must not correlated with the independent variables pooled OLS linear regression is given as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{4it} + \beta_4 X_{5it} + U_{it} \qquad 2$$

Where $Y_{it}$is the dependent variable; β_0 is a constant term: X_1, to X_4, are the independent variables; β_1 *to* β_4 are slope parameters: i...n refer to the cross-sectional units and t is the time period.

Random Effect (RE) Model: the RE technique which is equally known as the Error Components Model (ECM) is an alternative to FE technique. Basically, the RE estimator assumes that the intercept of an individual unit is a random component that is drawn from a larger population with a constant mean value. The individual intercept is then expressed as a deviation from this constant mean value. One major merit of the RE over the FE is that it is economical (parsimonious) in degrees of freedom. This is because one does not have to estimate *N* cross-sectional intercepts but just only the mean value of the intercept and its variance.The RE technique is suitable in cases where the (random) intercept of each cross-sectional unit is uncorrelated with the regressors. Since there is no significant correlation between the unobserved units of observation, specific random effects and the regressors, the RE model may be more appropriate. In our case, this leads to the assumption that they α_t are random factors, independently and identically distributed over individuals. Thus we write the random effects model as

$$y_{it} = \mu + x_{it}\beta + x_{it}\beta + \alpha_i + \varepsilon_{it} \qquad 3$$

Where $\alpha_t + \varepsilon_{it}$ is treated as an error term consisting of two components: an individual specific component, which does not vary over time, and a remainder component, which is assumed to be uncorrelated over time.

Estimation Techniques

Panel Unit-Root Tests

Recent literature suggests that panel-based unit root test have higher power than unit root test based on individual time series, see Levin, Lin and Chu(2002), Im, Persaran and Shin(2003), and Breitung(2000) to mention a few of popular test purchasing power parity (PPP) and growth convergence in macro panels using country data over time. This research focus on five type of panel unit root test such as Levin, Lin and Chu(2002), Breitung(2000), Im, Pesaran and Shin(2003), Fisher-Type test using ADF and PP-test (Maddala and Wu(1999) and Choi(2001)), Hadri(1999).

Panel Cointegration Test

Kao (1999) uses both DF and ADF to test for cointegation in panel as well as this test similar to the standard approach adopted in the EG-step procedures. Also this test start with the panel regression model as set out.

4. Results and Recommendations

The tables below explain the dynamic relationship between monetary policy and assets quality of commercial banks.

Table 1: The effect of Monetary Policy on Assets Quality Indicators of Commercial Banks in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
	Fixed Effect Regression Model			
C	45.23980	7.222537	6.263699	0.0000
CRR	0.019739	0.318030	0.062066	0.9506
M2	-0.198432	0.102213	-1.941366	0.0445
OMO	-0.039156	0.186651	-0.209782	0.8342
MPR	0.107846	0.325207	0.331623	0.7407
TBR	0.139227	0.227847	0.611054	0.5423
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.810139	Mean dependent var		46.60579
Adjusted R-squared	0.781895	S.D. dependent var		12.16437
S.E. of regression	5.680973	Akaike info criterion		6.437699
Sum squared resid	3905.088	Schwarz criterion		6.836922
Log likelihood	-431.6389	Hannan-Quinn criter.		6.599931
F-statistic	28.68372	Durbin-Watson stat		2.124969
Prob(F-statistic)	0.000000			
	Random Effect Regression Model			
	Coefficient	Std. Error	t-Statistic	Prob.
CRR	0.115116	0.131755	0.873714	0.3838
M2	3.89E-05	0.000566	0.068640	0.9454

OMO	0.102967	0.148999	0.691060	0.4907
MPR	-0.127465	0.101911	-1.250747	0.2132
TBR	-0.048540	0.095212	-0.509812	0.6110
C	11.72370	1.475472	7.945723	0.0000
	Effects Specification			
			S.D.	Rho
Cross-section random			0.451783	0.0210
Idiosyncratic random			3.082815	0.9790
	Weighted Statistics			
R-squared	0.336997	Mean dependent var		12.22776
Adjusted R-squared	0.201064	S.D. dependent var		3.055260
S.E. of regression	3.053635	Sum squared resid		1249.508
F-statistic	1.029601	Durbin-Watson stat		1.938297
Prob(F-statistic)	0.402877			
	Unweighted Statistics			
R-squared	0.039297	Mean dependent var		13.47700
Sum squared resid	1270.300	Durbin-Watson stat		1.906399

Source: computed from E-view 9.0

The empirical evidence obtained from Table 4.6 above suggests that the coefficients of the log cash reserve ratio are positive but not significant for assets quality regression at 1 percent significant level. The table shows that the two different estimation models offer quite similar results for size but slightly different levels of significance. The significant exception is that while the coefficients of cash reserve ratio are highly 95 significant at 1% level for the random effects and pooled OLS models; it is not also significant at 5 percent level under the fixed effect model.

The table however shows that open market operation has negative and no significant relationship with assets quality indicators of Nigeria commercial banks soundness at fixed effect model but positively correlated and no significant relationship at random effect model. Money supply showed a negative correlation but significant relationship at 5 percent level. The table further shows that monetary policy rate and treasury bill has positive and no significant relationship with assets quality indicators of Nigeria commercial banks soundness at fixed effect model but negative at random effect model. Both the fixed effects and random effects models show a non-significant negative relationship.

The adjusted R^2 which ranges from 0.781895and 0.201064 is satisfactory in all cases. This indicates that on the average about 78 percent to 20 percent of the variation in the assets quality indicator of Nigeria commercial banks soundness has been explained by the interactions in monetary policy variables as formulated in the regression model. The F-statistics (Fisher statistics which is a measure of the overall goodness of fit of regression) of 28.68372 and 1.029601for both the Fixed effects and Random effects statistics are not significant at 5% level. However, the prob (F-statistics) of 0.000000 for the fixed effect model is highly significant for Asset quality indicator of commercial bank soundness, which implies that the regression model fitted the data, therefore there is goodness of fit. The Prob.(F-statistic) of 0.402877 for the Radom effect model is not significant.

The rule of thumb for Log Likelihood criteria is that it must be very low in value; therefore, from the observed value above of -431.6389 in our model, it means that the model has performed well and is very reliable. Akaike info and Criterion and Shcwarz Criterion were also evaluated from the regression results above. The rule of thumb here is that it must be very low. The observed figures in the table above are very low in value and therefore means the model has strong forecasting power.

Durbin Watson-statistics also indicate that the regression equation and estimates are significant. The DW obtained i.e. 2.124969and 1.938297 further indicate that the regression equation is free from the problem of auto correlation.

Table 2: Panel Unit Root Test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Series: AQI				
Levin, Lin & Chu t*	-8.00917	0.0000	14	112
Im, Pesaran and Shin W-stat	-3.99534	0.0000	14	112
ADF - Fisher Chi-square	69.5334	0.0000	14	112
PP - Fisher Chi-square	122.586	0.0000	14	126
Series: CRR				
Levin, Lin & Chu t*	-20.5703	0.0000	14	112
Im, Pesaran and Shin W-stat	-16.4612	0.0000	14	112
ADF - Fisher Chi-square	213.402	0.0000	14	112
PP - Fisher Chi-square	328.883	0.0000	14	126
Series: D(M2)				
Levin, Lin & Chu t*	-5.56776	0.0000	14	98
Im, Pesaran and Shin W-stat	-2.88844	0.0019	14	98
ADF - Fisher Chi-square	57.6057	0.0008	14	98
PP - Fisher Chi-square	313.063	0.0000	14	112
Series: D(MPR)				
Levin, Lin & Chu t*	-6.02873	0.0000	14	98
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.24376	0.0124	14	98
ADF - Fisher Chi-square	49.1869	0.0080	14	98
PP - Fisher Chi-square	85.2379	0.0000	14	112
Series: D(OMO)				
Levin, Lin & Chu t*	-7.23939	0.0000	14	98
Im, Pesaran and Shin W-stat	-2.15623	0.0155	14	98
ADF - Fisher Chi-square	48.0189	0.0107	14	98
PP - Fisher Chi-square	159.523	0.0000	14	112
Series: D(TBR)				
Levin, Lin & Chu t*	-18.6355	0.0000	14	98
Im, Pesaran and Shin W-stat	-6.81131	0.0000	14	98
ADF - Fisher Chi-square	108.918	0.0000	14	98
PP - Fisher Chi-square	60.5753	0.0003	14	112

Source: computed from E-view 9.0

As a starting point of panel stationarity analysis, we employ the first generation panel unit root tests which allow for cross-sectional independence between variables. As displayed in Table 4.7 the results suggest that the monetary policy and commercial bank soundness null hypothesis be rejected by all the first generation tests (LLC, IPS, ADF and PP Fisher).

We can conclude that the results of panel unit root test (IPS test) reported support the hypothesis of a unit root in all variables across among the variables, as well as the hypothesis of zero order integration in first differences. Even at one percent significance level, we found that all tests statistics in both with and without trends significantly confirm that all series strongly reject the unit root null. Given the result of IPS test, it is possible to apply panel cointegration method in order to test for the existence of the stable long–run relation among the variables.

Table 3: Panel Cointegartion Test

Series: AQI CRR M2 MPR OMO TBR

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-11.38844	0.0004	-12.11233	0.0004
Panel rho-Statistic	14.09594	0.0000	13.92437	0.0000
Panel PP-Statistic	-11.87547	0.0003	-11.81570	0.0048
Panel ADF-Statistic	14.18956	0.0001	10.62424	0.0042
Alternative hypothesis: individual AR coefs. (between-dimension)				
	Statistic	Prob.		
Group rho-Statistic	15.519654	0.0000		
Group PP-Statistic	13.909610	0.0000		
Group ADF-Statistic	1 1.468070	0.0090		

Source: computed from E-view 9.0

This is to investigate whether long–run steady state or cointegration exist among the variables and to confirm what Coiteux and Olivier (2000) state that the panel cointegration tests have much higher testing power than conventional cointegration test. Since the variables are found to be integrated in the same order I(1), we continue with the panel cointegration tests proposed by Pedroni (1999, 2004). Cointegrations are carried out for constant and constant plus time trend and the summary of the results of cointegrations analyses are presented in table 3. In constant level, we found that the seven statistics reject null hypothesis of no cointegration at the five percent level of significance for the ADF statistic and group ρ –statistic, while the group –ADF is significant at one percent level.

Table 4: Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
CRR does not Granger Cause AQI	112	1.02531	0.3622
AQI does not Granger Cause CRR		0.55867	0.5736
M2 does not Granger Cause AQI	112	0.67260	0.5125
AQI does not Granger Cause M2		0.02170	0.9785
MPR does not Granger Cause AQI	112	1.75435	0.1780
AQI does not Granger Cause MPR		0.02750	0.9729
OMO does not Granger Cause AQI	112	0.73800	0.4805
AQI does not Granger Cause OMO		0.13526	0.8736
TBR does not Granger Cause AQI	112	1.36883	0.2588
AQI does not Granger Cause TBR		0.54262	0.5828

Source: computed from E-view 9.0

As shown in table 4.9, above, there is no causal relationship between the variables, this means we accept null hypothesis of no causal relationship as against the alternate.

5. Discussion of Findings

From the regression results the coefficients of cash reserve ratio, though as expected is positively correlated with asset quality indicators of commercial bank soundness but does not have significant impact. This implies that a unit increase on cash reserve ratio will not significantly increase commercial banks asset quality indicators of commercial banks.

The positive effect of cash reserve ratio on capital adequacy indicator and assets quality confirm our a-priori expectation of the study and the objective of monetary policy. It also confirms the operational objective of bank regulation as contained in Central Bank of Nigeria Act 1959 as amended. The Central Bank of Nigeria Act 1959 as amended empowered the Central Bank with the regulatory function on the commercial banks. Over the years cash reserve ratio has been varied with the objective of achieving set goals such as ensuring that the commercial banks

are liquid to avoid over trading that can lead to bank failure. The positive effect of the variables confirms liquidity theories such as the real bill doctrine. The commercial loan or the real bills doctrine theory states that a commercial bank should finance only short-term self-liquidating productive loans to business organizations. Loans meant to finance the production, and evolution of goods through the successive phases of production, storage, transportation, and distribution are considered as self-liquidating loans.

Variations in reserve requirement such as liquidity reserve, cash reserve and supplementary reserves can also be effectively used by the central bank to control commercial banks liquidity and influence their credit operations (Frederic, 2012). This instrument include the manipulation of banks cash reserves balance (variable cash reserve ratio), liquid assets reserve (variable liquidity ratio and several types of supplementary reserves (like special deposits and stabilization securities). In using this, the monetary authorities have the power not only to alter the composition of the liquid assets for computation of the liquidity ratio but also the liquidity ratio itself. If the reserve is increased, commercial banks will have less cash for investment, thereby affecting its performance negatively. However, Nigerian monetary policy administration is too harsh to the commercial banks management and therefore does not impact positively to the performance of commercial banks. The estimated the regression results the coefficients of open market as expected is positive and have positive but insignificant relationship with assets quality indicators. This implies that a unit increase on open market operation will not significantly increase commercial banks does not significantly affect asset quality indicator of commercial banks. The positive effect of open market operation on assets quality confirm our a-priori expectation of the study and the objective of monetary

The coefficients of monetary policy rate as expected is positive and have no significant relationship with assets quality indicators. This implies that a unit increase on monetary policy rate will not significantly increase commercial banks does not significantly affect asset quality indicator of commercial banks. The positive effect of monetary policy rate on assets quality confirms our a-priori expectation of the study and the objective of monetary.

The coefficients of Treasury bill rate as expected is positive and have no significant relationship with the assets quality of indicators of commercial banks soundness within the periods covered in this study. This implies that variation on Treasury bill rate will not significantly increase commercial banks soundness indicators. Again, the positive effect of Treasury bill rate on assets quality confirms our a-priori expectation of the study and the objective of monetary. It further confirms the operational objective of bank regulation as contained in Central Bank of Nigeria Act 1959 as amended. The positive effect of cash reserve ratio confirm the empirical findings of Akanbi & Ajagbe (2012) that net profit, liquidity ratio, cash ratio and interest rate on savings which confirms to the prior expectation. Akomolafe, Danladi, Babalola & Abah (2015) that there is a positive relationship between banks profits and monetary policies as proxied by money supply and interest rate. And the findings of Amidu & Wolfe (2008) that Ghanaian banks' lending behavior is affected significantly by the country's economic support and change in money supply.

6. Conclusion and Recommendations

Conclusion

Cash reserve ratio has positive and not significant relationship with assets quality indicators of commercial bank soundness in Nigeria. The finding proved that increase on the variables will lead to significant decrease on assets quality indicator of the commercial banks. Open market operation has positive and insignificant relationship with assets quality indicators. This implies that a unit increase on open market operation will not significantly increase commercial banks assets indicator of commercial banks soundness.

Monetary policy rate have positive and have no significant relationship with assets quality indicators. This implies that a unit increase on monetary policy rate will not significantly increase not significantly affect asset quality indicator of commercial banks. Treasury bill rate have positive and have no significant relationship with the assets quality indicators of commercial banks soundness within the periods covered in this study. This implies that variation on Treasury bill rate will not significantly increase assets quality commercial banks soundness indicators. The study conclude that money supply have negative but significant effect on assets quality indicator of commercial bank soundness.

Recommendations

- The Central Bank Of Nigeria Should Effectively And Thoroughly Consider The Use Of Money Supply As An Instrument To Affect The Commercial Bank Soundness In Nigeria. This Is Because This Study Showed That Money Supply Has Significant Relationship With Asset Quality, Earnings And Profitability And Liquidity Indicators Used As Proxies For Commercial Bank Soundness Within The Period Of This Study. This Result Agrees With Akomolafe, Et Al. (2015) Who Posited That There Is A Significant Relationship Between Money Supply And Commercial Bank Performance In Nigeria.
- The Regulatory Authorities Should Intensify Effective And Continuous Monitoring Of Commercial Banks Onsite And Offsite To Ensure Strict Compliance To Regulations. Such Continuous Supervisory Exercise Will Guide Against Any Policy Abuse And Manipulation Of Financial Reports.
- Government And Regulatory Authorities Of Commercial Banks Should Look Beyond Monetary Policy And Strive Towards Creating A Conducive Business Climate As A Way Of Improving Bank Performances. Government Eases Of Doing Business Initiative And Provisions In The Finance Act 2020, Which Makes Provisions Reduction Of Tax Rates For Some Profit Threshold Is Good Steps In The Right Direction.

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