
A Linearity Test in Determining the Role of Equity Capital on Credit Creation among Nigerian Microfinance Banks

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Abstract

*The research looked at the role of equity on credit creation among Nigerian micro finance banks. Despite the increase of minimum deposits of various banks, banks profitability has not shown growth in line with the regulation and policy measures by regulatory authorities. Banks have not adjusted to the policy measures as suggested in line with the banking reforms. The research attempts at investigating the linear relationship between equity bank capital on one hand and credit creation on the other so as to know the possible effect of equity bank capital on credit creation and the extent of exposure of depositors funds to risk of loan loose. In the E-view statistics using least squares (NLS and ARMA) the linear equation is re-stated as $gdp_{gross_exp} = c(1) + c(2) * oil_exp_{year}$. The dependent variable followed by least of regressors including ARMA and PDL terms involved an explicit equation stated thus; $Y = c(1) + c(2) * X$. The high correlation and the closeness of the values of the R^2 and adjusted R^2 means that the chances of other variables not included in the equation have little impact on the dependent variable. The Durbin Watson statistics is meant to reveal if there are signs of serial correlation and to what extent. The AIC, or Schwarz criterion, shows that the difference between the two is very negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model. That the differences between the R^2 and adjusted R^2 are negligible is an indicator that the regression line approximates the real data points and so is a very good fit and also shows how well observed outcomes in the analyses are replicated in the model. The shareholders share a greater part of the risk by increasing the equity capital and constantly measuring it with the loans and advances. The shareholders' funds are less exposed to risk of loan losses as depositor's funds are increasingly depended on. Therefore one is compelled to yield to reason of evidence by accepting the first hypothesis H_1 : That there is a significant linear relationship between equity bank capital and credit creation in the Nigerian microfinance banking industry. It is highly recommended that the existing equity capital of microfinance bank be increased since in the twenty five years understudy, it is becoming apparent that in the last three years studied that the loans and advances on the average increased at a more disturbing rate than equity capital. This could only mean that depositor's funds are increasingly getting more exposed to loan default due to increase in loans and advances.*

1.0 Introduction

The Nigerian banking sector has gone through rapid changes over the recent banking sector

reforms. Banking reforms in Nigeria started in July, 2004 and climaxed in August 2009 and beyond. Prior before the reform, developments in banking sector indicated a mixed trend in the performance of banks (Okafor, 2013).

Banking reforms is that aspect of socio-economic reforms which focuses essentially on getting conditionality's right for the banking sector to take the lead role in empowering the private sector and to contribute more to economic growth (Ugwu and Onyeabor, 2012).

Hitherto, the banking sector in Nigeria had undergone four phases of bank sector reforms since the commencement of Structural Adjustment Programme (SAP) this include; financial system reform of 1986 to 1993 which led to deregulation of the banking industry; the 1993-1998 financial systems reforms, with the re-introduction of regulations, the 1999 financial system reforms that saw the return to liberalization of financial sectors, accompanied with the adoption of certain regulation programmes, and the 2004 banking sector reforms crystallized by Prof. Soludo.

Soludo (2007) asserted that financial system was characterized by structural and operational weaknesses and that their catalytic role in promoting private sector led growth could be further enhanced through a more pragmatic reform, hence, the 2004 bank reform exercise.

Generally, the banking system is unarguably the engine of growth in any economy in the world, either developed or under-developed, through its function of financial intermediation (Oladejo and Oladipupo, 2011). It occupies a crucial position in the country's financial system to supply customers' medium of exchange such as cash, cheque, checking accounts, credit cards, and to accept funds from depositors and lend it out to borrowers. In addition, they serve as important agents in the development process.

Banking reforms by the Central Bank of Nigeria has resulted to the positive changes of the banking reforms in the emergence of 25 banks out of the 89 pre-consolidation banks existing in Nigeria (Ugwu and Onyeabor, 2012).

Okafor (2013) report that the aggregate capital base of banks which stood at ₦348 billion before consolidation has notched up to ₦ 768 billion at the end of 2004.

The nexus between reforms and banking sector performance has long been established in extant literature (Business day 2004). Nelson (2013) states that the banking sector reforms leads to better corporate governance codes which are good for the banking industry that suffered several years of abuse and neglect the larger extent have been restored. Prior to reforms, operators in the banking sector seemed not to think that banking demands circumspection and adherence to rules.

Despite the fact that banking sector reforms have shown positive contributions in some cases, but in some cases it is resulting to a negative contribution. Okafor (2013) found that reforms in the Nigerian banking sector had human resource challenges.

Conceptionally, economic reforms are undertaken to ensure that every part of the economy functions efficiently in order to ensure achievement of macro-economic goals of price stability, full employment, high economic growth and development manifested in high per capita income, improved standard of living, increased gross domestic products and favourable Balance of Payment position.

Thus, banking reforms in Nigeria is an integral part of the country-wide reform programme undertaken to reposition the Nigerian economy to achieve the objective of becoming one of the 20 largest economies by the year 2020, making the system more effective and strengthening its growth potentials.

Also, there is a need for periodic reforms in order to foster financial stability and confidence in the system (Sanusi, 2012).

According to Okeke (2014), reforms are deliberate actions by the government to fast-track, jump-start and consolidate specified sectors of the economy to achieve desired objectives.

Ebong (2014), financial reforms are deliberate policy response to correct perceived or impending financial crisis and subsequent future reforms in the financial industry are aimed addressing issues such as governance, risk management and operational inefficiencies. The vortex of most financial reforms is around firming up capitalization. Special financial reforms are primarily made up by the need to achieve the objectives of consolidation, competition and convergence in the financial architecture (Deccan 2014).

Financial reforms and attendant policy prescription are age long phenomena. They present the various transformations and policy adjustments and overhaul that are directed at the art, practice and activities of financial institutions and market overtime in response to nominal need for operational improvement and growth of both the institutions and economy as a whole. They could be internal or external reflecting critical comprehensive amendments, restructuring and/or additions to the existing body of laws, guidelines and policies (Chinedu Muogbalu, 2013).

In Nigeria, the ability of the financial sector to play its role has been periodically punctured by its vulnerability to systematic distress and macro-economic volatility and policy fine tuning inevitability (Kama, 2015). Consequently, the financial reforms were focused on further liberalization of banking business, ensuring competition and safety of the system and proactively positioning their interrelation with the capital market to boost the financial intermediation with the hope to serve as a catalyst to economic growth and development.

In many emerging markets including Argentina, Brazil and Korea, financial reforming have also become as prominent as banks strive to become more competitive and resilient to shocks as well as reposition their operations to cope with the challenges of the increasing globalised banking system (Oke, M.O and Adeusi, S.O. 2012).

Like other emerging economies, Nigeria has been involved in financial reforms on a regular basis aimed at responding to the challenges posed by some factors or developments such as systemic crisis, deregulation, globalization and technological innovations, or act as proactively both to strengthen the financial system and prevent systematic problems as in case in the current reforms (Imala 2015).

The reforms of the banking sector with particular reference to the Structural Adjustment Programme (SAP) of 1986, was aimed at increasing the efficiency of the financial sector, among others (Iganiga 2010). The financial sub-sector needs to be reformed in order to enhance its competitiveness and capacity to play its fundamental role of financial investment. Banking sector reforms are propelled by the need to deepen the financial sector and reposition it for growth to become integrated into the global financial architecture and evolve a banking sector that is consistent with regional integration requirements, savings mobilization, and the requirement of international best practices (Nnanna, Englanga and Odoko 2013).

Lemo, T. (2015) the primary objective of the reforms was to guarantee an efficient and sound financial sector. He went on to state that the Nigeria financial reforms were designed to

enable the banking industry develop the required resilience to support the economic development of the nation by efficiently performing its functions of financial intermediation, adding that a fundamental objective of the programme was to ensure the safety of depositors' money, position banks to play active developmental roles in the Nigerian economy and become major players in the sub regional and global financial market.

Referring to 2004-2005 banking consolidation and reforms in Nigeria, Okonjo Iweala and Osafo-kwaako (2007:15) stated that in order to strengthen the banking sector and improve availability of domestic credit to the private sector, a bank consolidation exercise was launched in mid-2004. The Central Bank of Nigeria requested all deposit taking banks to raise their minimum capital base from about US \$192million by the end of 2005.....in the process of meeting the new capital requirement, banks raised the equivalent of about \$3 billion from domestic capital markets and attracted about \$652million Foreign Direct Investment (FDI) into Nigerian banking sector.

According to Sanusi (2011) "banking reforms the world over on the need to increase risk management procedures and enhance corporate governance in order to strengthen and reposition the banking industry to enable it contribute effectively to the development of the real sector through intermediation process a comprehensive process of substantially improving the regulatory and surveillance framework, fostering healthy competition in banking operations, ensuring efficient frame work, fostering healthy competition in banking operations, ensuring efficient framework for monetary management, expansion of savings mobilization base, enforcement of capital adequacy, promotion of investment and growth through market-based interest rates, increasing sophistication of the global financial products, and even the recent global financial crisis, all make the essential need for banking reforms a "*Sin qua non*".

Commenting specifically on the 2004 banking reforms in Nigeria, Sanusi (2011) again explained that the thrust of the policy was to grow the banks and position them to play pivotal roles in driving development in other sectors of the economy, as well as induce improvements in their own operational efficiency..... the need to recapitalize the banks and ensuring minimum reliance on public sector for funds, the adoption of risk-focused and rule-based regulatory funds, the adoption of zero tolerance in regulatory framework in data/information rendition/reporting and infractions, the need for strict enforcement for corporate governance principles in banking, expeditious process for rendition of returns for banks and other financial Institutions through e-Fass, revision and updating of dormant laws and ensuring greater transparency and accountability in the implementation of banking laws and regulations.

Further enunciating on the need for banking sector reforms, Sanusi (2011) again said it involves the movement from an initial situation of controlled interest rate, poorly-developed money and securities market and under-developed banking system, towards a situation of flexible interest rates, an expanded role for market forces in resource allocation, and a deepening of the money and capital markets.

1.2 Problem of research study

The problems that have stirred a need for this research are the challenges that have emerged from reforms in Nigeria banking system and opportunities opened to banks in Nigeria. In the fact of age long systematic distress, the loose grasp of authorized regulatory body i.e. Central Bank of Nigeria (CBN), Nigeria Deposit Insurance Corporation (NDIC) etc. on the

administration, control and development of banks, the unethical and poor standards practices of bank themselves gave rise to insecurity of deposits of banks, inability to give loan and fraudulent activities by employees due to a porous style of banking. Despite the increase of minimum deposits of various banks, banks profitability has not shown growth in line with the regulation and policy measures by regulatory authorities. Banks have not adjusted to the policy measures as suggested in line with the banking reforms. The critical examination of these problems after the recapitalization policy has been affected gave rise to the research questions below.

1.3 Research objective

The research objective is to conduct a test for linearity between equity capital and credit creation

1.4 Research hypotheses

H1: That there is a significant linear effect between equity capital and credit creation in Nigerian microfinance banks

H0: That there is no significant linear effect between equity capital and credit creation in Nigerian microfinance banks

2.0 Literature review

Conceptual literature

Robust economic growth cannot be achieved without putting in place well focused programmes to reduce poverty through empowering the people by increasing their access to factors of production, especially credit. The latent capacity of the poor for entrepreneurship would be significantly enhanced through the provision of microfinance services to enable them engage in economic activities and be more self-reliant; increase employment opportunities, enhance household income, and create wealth.

Microfinance is about providing financial services to the poor who are traditionally not served by the conventional financial institutions. Three features distinguish microfinance from other formal financial products. These are:

- (i) The smallness of loans advanced and or savings collected.
- (ii) The absence of asset-based collateral, and
- (iii) Simplicity of operations.

In Nigeria, the formal financial system provides services to about 35% of the economically active population while the remaining 65% are excluded from access to financial services. This 65% are often served by the informal financial sector, through Non-Governmental Organization (NGO)-microfinance institutions, moneylenders, friends, relatives, and credit unions. The non-regulation of the activities of some of these institutions has serious implications for the Central Bank of Nigeria's (CBN's) ability to exercise one aspect of its mandate of promoting monetary stability and a sound financial system.

A microfinance policy which recognizes the existing informal institutions and brings them within the supervisory purview of the CBN would not only enhance monetary stability, but also expand the financial infrastructure of the country to meet the financial requirements of the Micro, Small and Medium Enterprises (MSMEs). Such a policy would create a vibrant microfinance sub-sector that would be adequately integrated into the mainstream of the national financial system and provide the stimulus for growth and development. It would also harmonize operating standards and provide a strategic platform for the evolution of

microfinance institutions, promote appropriate regulation, supervision and adoption of best practices. In these circumstances, an appropriate policy has become necessary to develop a long-term, sustainable microfinance sub-sector.

The purpose of this policy paper, therefore, is to present a National Microfinance Policy Framework for Nigeria that would enhance the provision of diversified microfinance services on a long-term, sustainable basis for the poor and low income groups. The policy would create a platform for the establishment of microfinance banks; improve the CBN's regulatory/supervisory performance in ensuring monetary stability and liquidity management; and provide appropriate machinery for tracking the activities of development partners in the microfinance sub-sector in Nigeria. This policy has been prepared in exercise of the powers conferred on the Central Bank of Nigeria by the provisions of Section 28, sub-section (1) (b) of the *CBN Act 24 of 1991* [as amended] and in pursuance of the provisions of Sections 56-60(a) of the *Banks and Other Financial Institutions Act [BOFIA] 25 of 1991* [as amended]. The policy paper has benefitted from wide consultations, through the conduct of a baseline survey on the activities of microfinance institutions (MFIs) in Nigeria, national and international consultative stakeholders' fora, as well as study tours to India, Pakistan, Indonesia, Philippines and Uganda.

The practice of microfinance in Nigeria is culturally rooted and dates back several centuries. The traditional microfinance institutions provide access to credit for the rural and urban, low-income earners. They are mainly of the informal Self-Help Groups (SHGs) or Rotating Savings and Credit Associations (ROSCAs) types. Other providers of microfinance services include savings collectors and co-operative societies. The informal financial institutions generally have limited outreach due primarily to paucity of loanable funds. In order to enhance the flow of financial services to Nigerian rural areas, Government has, in the past, initiated a series of publicly-financed micro/rural credit programmes and policies targeted at the poor. Notable among such programmes were the Rural Banking Programme, sectoral allocation of credits, a concessionary interest rate, and the Agricultural Credit Guarantee Scheme (ACGS). Other institutional arrangements were the establishment of the Nigerian Agricultural and Co-operative Bank Limited (NACB), the National Directorate of Employment (NDE), the Nigerian Agricultural Insurance Corporation (NAIC), the Peoples Bank of Nigeria (PBN), the Community Banks (CBs), and the Family Economic Advancement Programme (FEAP). In 2000, Government merged the NACB with the PBN and FEAP to form the Nigerian Agricultural Cooperative and Rural Development Bank Limited (NACRDB) to enhance the provision of finance to the agricultural sector. It also created the National Poverty Eradication Programme (NAPEP) with the mandate of providing financial services to alleviate poverty.

Microfinance services, particularly, those sponsored by government, have adopted the traditional supply-led, subsidized credit approach mainly directed to the agricultural sector and non-farm activities, such as trading, tailoring, weaving, blacksmithing, agro-processing and transportation. Although the services have resulted in an increased level of credit disbursement and gains in agricultural production and other activities, the effects were short-lived, due to the unsustainable nature of the programmes. Since the 1980s, Non-Governmental Organizations (NGOs) have emerged in Nigeria to champion the cause of the micro and rural entrepreneurs, with a shift from the supply-led approach to a demand-driven strategy. The number of NGOs involved in microfinance activities has increased significantly in recent times due largely to the inability of the formal financial sector to provide the services needed by the low income groups and the poor, and the declining support from

development partners amongst others. The NGOs are charity, capital lending and credit-only membership based institutions. They are generally registered under the *Trusteeship Act* as the sole package or part of their charity and social programmes of poverty alleviation. The NGOs obtain their funds from grants, fees, interest on loans and contributions from their members. However, they have limited outreach due, largely, to unsustainable sources of funds.

Justification for the Establishment of Microfinance Banks

From the appraisal of existing microfinance-oriented institutions in Nigeria, the following facts have become evident:

- Weak Institutional Capacity
- Weak Capital Base
- The Existence of a Huge Un-Served Market
- Economic Empowerment of the Poor, Employment Generation and Poverty Reduction
- The Need for Increased Savings Opportunity

The Microfinance Policy Objectives

The specific objectives of this microfinance policy are the following:

- i. Make financial services accessible to a large segment of the potentially productive Nigerian population which otherwise would have little or no access to financial services;
- ii. Promote synergy and mainstreaming of the informal sub-sector into the national financial system;
- iii. Enhance service delivery by microfinance institutions to micro, small and medium entrepreneurs;
- iv. Contribute to rural transformation; and
- v. Promote linkage programmes between universal/development banks, specialized institutions and microfinance banks.

The Microfinance Policy Targets

Based on the objectives listed above, the targets of the policy are as follows:

- i. To cover the majority of the poor but economically active population by 2020 thereby creating millions of jobs and reducing poverty.
- ii. To increase the share of micro credit as percentage of total credit to the economy from 0.9 percent in 2005 to at least 20 percent in 2020; and the share of micro credit as percentage of GDP from 0.2 percent in 2005 to at least 5 percent in 2020.
- iii. To promote the participation of at least two-thirds of state and local governments in micro credit financing by 2015.
- iv. To eliminate gender disparity by improving women's access to financial services by 5% annually; and
- v. To increase the number of linkages among universal banks, development banks, specialized finance institutions and microfinance banks by 10% annually.

The Microfinance Policy Strategy

A number of strategies have been derived from the objectives and targets as follows:

- i. License and regulate the establishment of microfinance Banks (MFBs)
- ii. Promote the establishment of NGO-based microfinance institutions
- iii. Promote the participation of Government in the microfinance industry by encouraging States and Local Governments to devote at least one percent of their annual budgets to micro credit initiatives administered through MFBs.

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- iv. Promote the establishment of institutions that support the development and growth of microfinance service providers and clients

The Goals of Microfinance Banks

The establishment of microfinance banks has become imperative to serve the following purposes:

- i. Provide diversified, affordable and dependable financial services to the active poor, in a timely and competitive manner, that would enable them to undertake and develop long-term, sustainable entrepreneurial activities;
- ii. Mobilize savings for intermediation;
- iii. Create employment opportunities and increase the productivity of the active poor in the country, thereby increasing their individual household income and uplifting their standard of living;
- iv. Enhance organized, systematic and focused participation of the poor in the socio-economic development and resource allocation process;
- v. Provide veritable avenues for the administration of the micro credit programmes of government and high net worth individuals on a non-recourse case basis. In particular, this policy ensures that state governments shall dedicate an amount of not less than 1% of their annual budgets for the on-lending activities of microfinance banks in favour of their residents; and
- vi. Render payment services, such as salaries, gratuities, and pensions for various tiers of government.

Bank industry usually argues that raising capital requirements will weaken banks, increase their funding costs because of higher risk profile of equities and consequently these costs will be passed on to borrowers making borrowing more expensive. This type of argumentation is not in line with one of the cornerstones of corporate finance, the Modigliani-Miller theorem, which with some simplification states that market value of a firm is independent of the way it finances its investments or distributes dividends. There are three basic methods of financing: getting additional capital, i.e. issuing shares, then there is borrowing and finally spending profits instead of distributing them to shareholders. Any changes in lending after capital requirements increase would mean that Modigliani-Miller theorem, one of the central pillars of finance theory, does not hold in practice. In reality debt financing is largely preferred over equity because of distortions created by public policies, especially tax policies giving advantage to debt and penalizing equity and implicit guarantees by the government which is less likely to let down institutions owners than its debtors.

Anat Admati (2010) argues however that this does not need to be this way and that "quite simply, bank equity is not expensive from a social perspective, and high leverage is not required in order for banks to perform all their socially valuable functions, including lending, taking deposits, and issuing money-like securities". Her main point is that when leverage is reduced, equity becomes less risky and the cost of equity goes down, which should not make any change in the value of financial institutions to their stakeholders. In other words, the more equity there is in the funding mix of a company, the lower the risk of the equity and thus its cost. Initially many Basel III impact studies suggested a more or less significant slowdown of economy as consequence of higher capital requirements, such as bank industry affiliated Institute of International Finance (2011) predicting that in order to absorb increased capital requirements, banks would need to raise lending rates, which would take loan volumes down and cause annual 0,6% hit to GDP growth in the US, the Eurozone and Japan and create over 7 million job losses. Roger and Vlek (2011) predicted a cumulative decrease

in GDP of around 1% and Macroeconomic Assessment Group established by the Financial Stability Board and the BCBS (MAG, 2010) estimated that annual growth would be reduced by 0,03% during first 35 quarters after implementation.

However in spite of capital requirements gone up significantly, "lending spreads have barely moved, banks interest margins are down and loan volumes are up" (Cecchetti, 2014). The same author argues that the macroeconomic impact of the after crisis increase in capital requirements was either imperceptibly small or was neutralized by monetary policy actions, i.e. low rates and unconventional monetary measures. Also Cohen (2013) observed that in spite of steadily increasing their capital ratios since the crises, large global banks continued to expand their lending. For the time being we still lack sufficient empirical evidence of effects on lending that macro prudential capital requirements might have. Bridges et al (2014) have analyzed effects of changing regulatory capital requirements on bank capital and bank lending in the context of bank-specific and time-varying capital requirements in place between 1990 and 2011 in the UK. It cannot be directly used for predicting macroeconomic effects of macro prudential capital requirements such as those introduced by Basel III, however it provides an indication on how banks might respond to increased capital requirements. What has been observed is that after capital requirements are increased, banks' capital buffers above the regulatory minimum are consumed to comply and banks reduce their lending until they gradually restore the buffers that they originally had which takes typically between 3 and 4 years. The credit reduction is materialized more in the real estate sector and less in other credit types. Such a reduction is only temporary and reaches 0,8% reduction in quarterly loan growth per one percentage point of increase the first year.

Gradually as the bank accumulates capital to restore its buffer, loan growth returns to its long term trend. Even if increasing capital requirements is associated with costs in the short term, the long term benefits in terms of increased stability of the financial system should be much higher. When estimated basis points of sacrificed real output are compared to tens or even hundreds of percent of GDP lost in financial crisis, the stability should be favored. While impact of increased capital requirements has only been modelled and estimated, it is known what were the costs of the last crisis – it has been quantified that the cumulated output loss might amount up to 90% of 2009 world GDP (Danthine, 2012). An overview of over 20 studies performed by BCBS (2010) suggests that historically consequences of financial crisis are enormous – median value of incurred costs is of 63% of pre-crisis output and the estimated average cost is even over 100%. There is a reason to believe that stronger capital requirements will not give rise to considerable, permanent economic costs in the long term. On the other hand, in a transitional phase, higher buffers may have a non-significant negative impact on growth in total credit and GDP.

Theoretical literature

Caballero A.S (2017) of the University of Barcelona opined that linear regression as an analytical method attempts at assessing if one or more predictor variable explains the dependent variable. The main assumptions being the linear relationship, multivariate normality, little or no multicollinearity, no auto-correlation and homoscedasticity. In her own submissions she cautioned about the adequacy of sample size of at least twenty cases per independent variable. To detect casual relationships in time series in economics and finance many methods are being developed and subsequently improved upon. One of such is the linear granger causality test using panel data while applying linear autoregressive model. Dufour and Renault (2006) used mixed frequency data based on the multiple-horizon framework to make some deep investigations to detect nonlinear causality in their study on

short run and long run causality using time series. Baek and Brok (1992) used bivariate model in a general test for nonlinear granger causality just as Hiemstra and Jones (1994) did using two time series. The research by Hiemstra and Jones (1994) testing for linear and nonlinear Granger causality in the stock price-volume relation is very often cited by economists working on linear models till this day.

Bai, Wong and Zhang (2010) in their work on multivariate linear and non-linear tests extended the HJ test from bivariate setting to multivariate setting in view of the economic and financial conditions prevailing. This extensions involved large amounts of applications geared at facilitating investment decisions. Zheng and Chen (2013) employed a system approach to stock modeling and forecasting. Chouldry T, Papadimitriou F and Shabi S (2016) in studying stock market volatility used linear and non-linear tests to draw a link with business cycle in major economies as Japan, United States, Canada and the United Kingdom. Chouldry T, Hassan S, Shabi S (2015) used linear and non-linear tests to establish a link between gold and stock markets in time of global crisis.

Diks and Panchenko (2005) recommended new statistics as a practical guide for nonparametric granger causality test after concluding that HJ test is significantly over – rejecting in simulation while revealing some of the underlying reasons for the questionable performance of HJ test. They found out that the estimators of the probabilities in the definition are not U-statistics unlike Hiemstra and Jones (1994) who in fact concluded that the central limit theorem of the test statistics is not valid. Bai et al (2010) proposed a set of consistent estimators of the probabilities in the definition of Hiemstra and Jones (1994).

Micro-finance banks with their level of capital cannot satisfy the need of the large percentage of the active poor that are now relying on them for loans to start business. Microfinance banks finance their fixed assets and operate with customers' deposits. The result is that the Microfinance institutions in Nigeria lack finance required extending financial services to clients. According to microfinance letter (2007), the problem of microfinance banks primarily arise from low capital base of the institution, inordinate fixed asset acquisition, ostentatious operational disposition, inability to mobilize deposits, poor lending, and questionable governance and management arrangement. Onoyere I. A. (2014) maintains that some of the major challenges include poor capitalization and restrictive regulatory and supervisory procedures. The low capital base and the isolated mode of operation have hindered any meaningful contributions to financing activities. A minimum of Paid-up capital of N1.0 billion for a licensed microfinance bank to operate multiple branches within a state can act as serious bottleneck for efficient management of such Banks. As a result of the problem of finance, Ovia J. (2007), observes that there is inadequate channelling of fund for real sector development especially agriculture and manufacturing. According to him, only about 14.1% and 3.5% respectively are allocated to these sectors as against 78% funding for commerce. Low capital base of microfinance banks hinder their ability to meet the demand of their clients.

Another factor that hampers the performance of microfinance banks is insider abuse. The “insider abuse” in microfinance bank is made manifest in granting credit. Okpara G. C. (2009) pointed out that director's misuse their privileged positions to obtain unsecured loans which, in some cases are in excess of their banks' statutory lending limits. This is in violation of the provisions of policy of microfinance banks. Furthermore they approve loans for their friends and relatives without proper documentation. These loans turn out to be non performing credit. In addition, some of these owners grant interest waivers on non

performing insider-credits without obtaining approval from the CBN. They are known to have compelled their microfinance banks to directly finance trading activities through proxy companies. The benefits that accrue from such transactions are not ploughed back to the banks. They use microfinance banks as sources of funds for their private ventures. Board members are also known to misuse their positions to obtain loan facilities that are above the regulatory limit for insider related loans and with no intentions of repaying such facilities. They also use their positions to unduly influence and manipulate the recruitment processes in favour of their cronies. Acha I. A. (2012) mentioned that frauds and forgeries by both insiders and outsiders to the banks are rife and people generally obtain loans with no intention to repay.

In Nigeria, the availability of business opportunities authorized by Central Bank of Nigeria to microfinance banks are inadequate, as a result, the chances of survival for the microfinance banks are very lean. Unlike Bangladesh and some other countries, where some microcredit organizations give their clients more than loans, offering education, training, healthcare, and other social services. Typically, these organizations are not-for-profit or are owned by customers or investors who are more concerned about the economic and social development of the poor than they are with profits. The definition of microfinance bank by Asian Development Bank (2000) as the provision of broad range of services such as savings, deposits, loans, payment services, money transfers and insurance to poor and low income households and their micro-enterprises confirm the fact that in Asian countries, microfinance banks have more available business opportunities than they have in Nigeria

3.0 Methodology

3.1 Research Design

The research attempts at investigating the linear relationship between equity bank capital on one hand and credit creation on the other so as to know the possible effect of equity bank capital on credit creation and the extent of exposure of depositors funds to risk of loan loose. This is similar to Kim and Singal (1993) where they adopted an ex-post facto research design. A situation where the independent variable has already occurred and the researcher starts with the observation of dependent variable on premise that a causal link exists between them and the independent variable.

3.2 Nature and Sources of Data

The data used for this research is secondary data got from the CBN statistical bulletins over the years. The data is considered adequately appropriate to draw solve the problem, it is cheaper to collect and is reliable as information needed to achieve the research objectives.

3.3 Model Specification

The model for this study was expressed in line with the hypotheses stated as follows

H1: That there is a significant linear relationship between equity bank capital and credit creation in the Nigerian banking industry

H0: That there is no significant linear relationship between equity bank capital and credit creation in the Nigerian banking industry

In the E-view statistics using least squares (NLS and ARMA) the linear equation is re-stated as $gdp \text{ gross_exp oil_exp year } c$. The dependent variable followed by least of regressors including ARMA and PDL terms involved an explicit equation stated thus;

$$Y = c(1) + c(2) * X$$

Where Y represents the dependent variable and X represents the independent variable
A second order linear differential equation is an equation which can be written in the form

$$Y + p(x)y + q(x)y = f(x) \dots\dots\dots (1)$$

Where p, q, and f are continuous functions on some interval I and Y is the dependent variable and X is the independent variable.

3.4 Model Assumptions

The assumptions that were adopted for this research were based on the following assumptions

1. The model specification is assumed to be error free having been used as a measure for quantifying data of a secondary nature in previous research of this nature.
2. The parameters estimated have to be commensurate with the quantity of data. If the quantity of data is not appropriate then the analysis would be flawed with problems such as those associated with multicollinearity.

In particular, we will consider the following assumptions.

- Linearity - the relationships between the predictors and the outcome variable should be linear
- Normality - the errors should be normally distributed - technically normality is necessary only for the t-tests to be valid, estimation of the coefficients only requires that the errors be identically and independently distributed
- Homogeneity of variance (homoscedasticity) - the error variance should be constant
- Independence - the errors associated with one observation are not correlated with the errors of any other observation
- Model specification - the model should be properly specified (including all relevant variables, and excluding irrelevant variables)

Additionally, there are issues that can arise during the analysis that, while strictly speaking are not assumptions of regression, are none the less, of great concern to regression analysts.

- Influence - individual observations that exert undue influence on the coefficients
- Collinearity - predictors that are highly collinear, i.e. linearly related, can cause problems in estimating the regression coefficients.

3.6 Variables

The variables used in the models are the dependent and independent variables, the former representing the effects while the latter represents the causes. Given that the model is statistical, the research looked at the dependent variable studied to find out variations caused by the independent variable.

3.7 Model Justification

According to Andrews B.H, Dean .D Matthew, Swain Robert and Cole Caroline (2013) justified the model in use by linking the assumptions of the iterative model building processes with the rigorously performed processes involved in multiple regression analysis. Autoregressive (AR) terms and one or more moving average (MA) terms will show the statistical significance of the dependent variable given the lagged values from previously made estimations. It is suitable for this research.

3.8 Techniques of Analysis

Regression analysis is used in modelling and analyzing the variables, since the focus is on the relationship between the dependent variable and the independent variable.

4.0 Data analysis and discussion of findings

Table 4.1 Data presentation

Year	Shareholders fund (N'm)	Shareholders fund growth rate (%)	Loans & Advances (N'm)	Loans & Advances growth rate (%)
1992	277.00		135.80	
1993	625.30	2.26	654.50	4.82
1994	935.40	1.50	1,220.60	1.86
1995	861.00	0.92	1,129.80	0.93
1996	870.70	1.01	1,400.20	1.24
1997	1,385.00	1.59	1,618.80	1.16
1998	1,479.30	1.07	2,526.80	1.56
1999	1,858.40	1.26	2,958.30	1.17
2000	2,773.60	1.49	3,666.60	1.24
2001	1,034.80	0.37	1,314.00	0.36
2002	3,825.60	3.70	4,310.90	3.28
2003	7,011.10	1.83	9,954.80	2.31
2004	8,156.40	1.16	11,353.80	1.14
2005	18,107.30	2.22	28,504.80	2.51
2006	12,810.70	0.71	16,450.20	0.58
2007	21,810.70	1.70	22,850.20	1.39
2008	37,021.80	1.70	42,753.10	1.87
2009	45,166.00	1.22	58,215.70	1.36
2010	43,997.50	0.97	52,867.50	0.91
2011	29,094.80	0.66	50,928.30	0.96
2012	42,829.10	1.47	90,422.20	1.78

2013	64,939.00	1.52	94,055.60	1.04
2014	53,039.00	0.82	112,110.10	1.19
2015	91,376.50	1.72	187,247.30	1.67
2016	77,868.70	0.85	196,195.00	1.05

Data Analysis

Table 4.2

Dependent Variable: LOANS__ADVANCES__N_M_

Method: Least Squares

Date: 05/13/18 Time: 11:10

Sample: 1992 2016

Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SHAREHOLDERS_FUND_ _N_M_ C	1.991815 -5552.242	0.122721 4292.637	16.23039 -1.293434	0.0000 0.2087
R-squared	0.919700	Mean dependent var	39793.80	
Adjusted R-squared	0.916209	S.D. dependent var	56292.46	
S.E. of regression	16294.84	Akaike info criterion	22.31170	
Sum squared resid	6.11E+09	Schwarz criterion	22.40921	
Log likelihood	-276.8963	Hannan-Quinn criter.	22.33875	
F-statistic	263.4254	Durbin-Watson stat	0.958231	
Prob(F-statistic)	0.000000			

Table 4.3

Dependent Variable: LOANS__ADVANCES__N_M_

Method: Least Squares with Breaks

Date: 05/13/18 Time: 11:12

Sample: 1992 2016

Included observations: 25

Break type: Bai-Perron tests of L+1 vs. L sequentially determined breaks

Break selection: Trimming 0.15, Max. breaks 5, Sig. level 0.05

Breaks: 2014

Variable	Coefficient	Std. Error	t-Statistic	Prob.
1992 - 2013 -- 22 obs				
SHAREHOLDERS_FUND_ _N_M_ C	1.464600 -396.9976	0.111752 2754.047	13.10579 -0.144151	0.0000 0.8868
2014 - 2016 -- 3 obs				

SHAREHOLDERS_FUND_				
_N_M_	2.136655	0.361018	5.918417	0.0000
C	6869.254	27356.76	0.251099	0.8042
R-squared	0.972784	Mean dependent var	39793.80	
Adjusted R-squared	0.968896	S.D. dependent var	56292.46	
S.E. of regression	9927.969	Akaike info criterion	21.38975	
Sum squared resid	2.07E+09	Schwarz criterion	21.58477	
Log likelihood	-263.3718	Hannan-Quinn criter.	21.44384	
F-statistic	250.1992	Durbin-Watson stat	1.562551	
Prob(F-statistic)	0.000000			

Table 4.4

Dependent Variable: LOANS__ADVANCES_GROWTH_

Method: Fully Modified Least Squares (FMOLS)

Date: 05/13/18 Time: 11:15

Sample (adjusted): 1994 2016

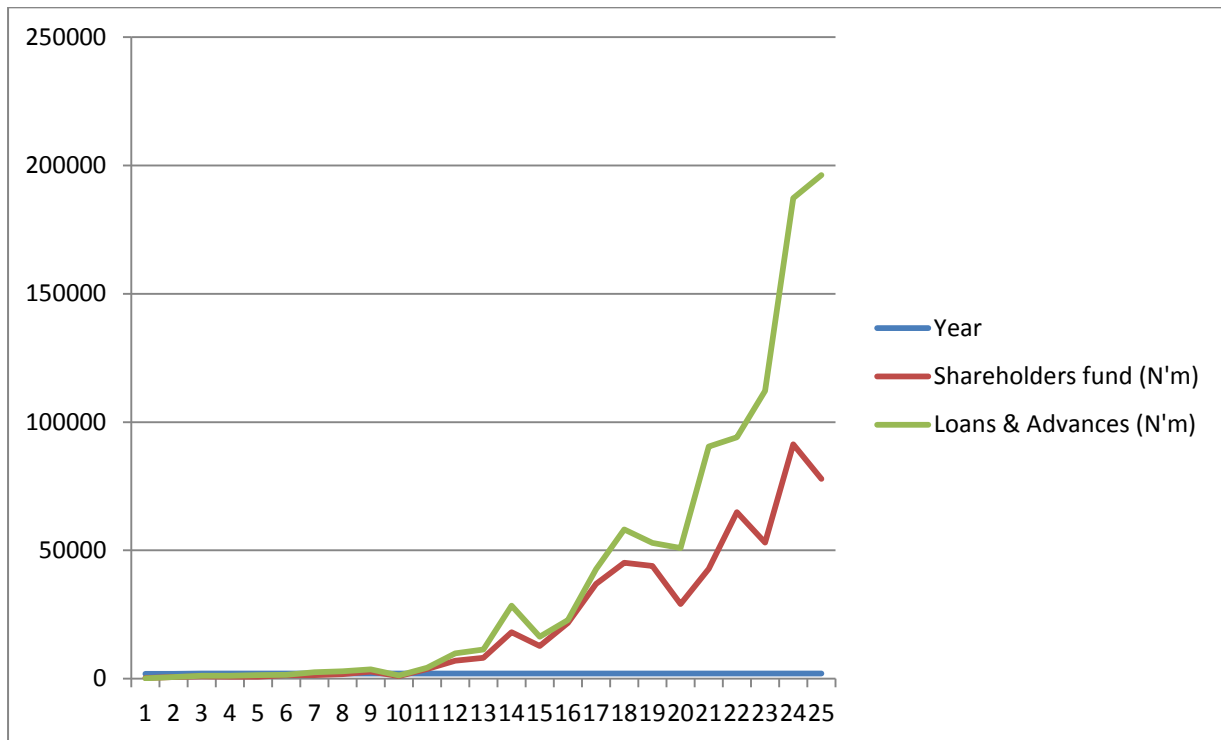
Included observations: 23 after adjustments

Cointegrating equation deterministics: C

Long-run covariance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SHAREHOLDERS_FUND_G				
ROWTH	1.058361	0.083014	12.74915	0.0000
C	-0.046458	0.126041	-0.368597	0.7161
R-squared	0.774738	Mean dependent var	1.415652	
Adjusted R-squared	0.764011	S.D. dependent var	0.646676	
S.E. of regression	0.314146	Sum squared resid	2.072446	
Durbin-Watson stat	2.882019	Long-run variance	0.068836	

Figure 4.0 Graphical Representations of Shareholders Fund and Loans & Advances



5.0 Discussion of findings and conclusions

The findings indicate that the goodness of fit of the model can be seen in the coefficient of determination (R-square). This means that the R² measures how well variations in the dependent variable (loans and advances) are explained by the independent variable (shareholders' funds) in twenty five years (1992 – 2016). The adjusted R² moderates the R² indicating that there may be other variables other than our explanatory variables that might have an impact on the dependent variable but not represented in the equation. These two values (R² & adjusted R²) indicates that the regression line approximates the real data points and so is a very good fit and also shows how well observed outcomes in the analyses are replicated in the model.

The Durbin Watson statistics shows a positive serial correlation at 1.5. The difference between AIC, or Schwarz criterion is negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model.

The R² and adjusted R² for table 4.2 indicate for the years under study, evidence of a very significant relationship between the shareholders' funds and loans and advances being 91.9% and 91.6% respectively. But in all these a good indicator that there is a good fit and that observed outcomes are well replicated as the regression line approximates the real data points. The Durbin Watson statistics which tests for autocorrelation in the residuals reveals that there are slight traces of spatial and serial positive autocorrelation at 0.96 for in the twenty five years under study. The Akaike and Schwarz criteria showed near perfect model convergence near zero with an average difference between the two criteria at 0.009 for table 4.2. And this is an indication that there is a better fit in the model since it shows a favourable trade – off between the lack of fit and the number of parameters in the model.

In table 4.3 the break type for the Bai-Perron tests employed showed that there were of L+1 vs. L sequentially determined breaks in 2014. This test was vital because it is possible that in twenty five years coefficients may be unstable and may result in forecasting problems. And just like in table 4.2 the R² (97.2%) and adjusted R² (96.8%) shows significant levels of variations in the dependent variable (loans and advances) were explained by the independent variable (shareholders' funds) in twenty five years (1992 – 2016). The high correlation and the closeness of the values of the R² and adjusted R² means that the chances of other variables not included in the equation have little impact on the dependent variable. The Durbin Watson statistics is meant to reveal if there are signs of serial correlation and to what extent. The AIC, or Schwarz criterion, shows that the difference between the two is very negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model. That the differences between the R² and adjusted R² are negligible is an indicator that the regression line approximates the real data points and so is a very good fit and also shows how well observed outcomes in the analyses are replicated in the model.

In table 4.4, cointegration tests were run to determine long-run covariance estimates using Bartlett kernel, Newey-West fixed bandwidth. The cointegration between the two variables was necessary to measure the extent of drift from each other in twenty five years. The mean dependent variable of 1.42 and the probability value depicts a constant distance between the two variables showing that the time it takes to revert to mean over the period under study is consistent enough. In time series analysis variables often deviate from their mean path because of shocks and cyclic fluctuations. OLS regressions do not capture these shocks and cyclic fluctuations so the cointegration is vital to accommodate such deviations in its estimation.

6.0 Conclusions

Many scholars who have studied this area concludes that bank capital made up of equity and debt actually cause high variations in the Loans and Advances and other forms of credit creation. This research indicates a very high correlation between equity capital and loans and advances. Many regulators are of the opinion that many bank deposits are exposed to grave risk of loan losses hence from time to time it becomes apparent that the shareholders share a greater part of the risk by increasing the equity capital and constantly measuring it with the loans and advances. A closer look at figure 4.0 showing a graph indicates that in 2014 especially, the shareholders' funds is less exposed to risk of loan losses as depositor's funds is increasingly depended on. Therefore one is compelled to yield to reason of evidence by accepting the first hypothesis H1: That there is a significant linear relationship between equity bank capital and credit creation in the Nigerian microfinance banking industry.

7.0 Policy Recommendations

It is highly recommended that the existing equity capital of microfinance bank be increased since in the twenty five years understudy, it is becoming apparent that in the last three years studied that the loans and advances on the average increased at a more disturbing rate than equity capital. This could only mean that depositor's funds are increasingly getting more exposed to loan default due to increase in loans and advances.

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