

CREDIT EXPANSION AND COMMERCIAL BANKS SOUNDNESS IN NIGERIA: AN APPLICATION OF MULTI -DIMENSIONAL ANALYSIS

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ABSTRACT: *This study examined the effects of credit expansion on commercial banks soundness in Nigeria. The objective was to ascertain the relationship between credit expansion and commercial banks soundness in Nigeria. Time series data was collected from Central Bank of Nigeria statistical bulletin and stock exchange factbook. Ordinary least square method was used as data analysis method. Model I had capital adequacy indicator was modeled as the function of bank credit to manufacturing sector, communication and transport, mining and quarrying, agricultural sector and credit to small and medium scale enterprises while model II modeled capital adequacy indicator as the function of credit to private sector, net domestic credits, medium term credits, short term credits and long term credits. From the findings, Model I found that the independent variables explained 77 percent variations on capital adequacy ratio. The beta coefficient found that all the independent variables have positive effects on bank capital adequacy except credit to manufacturing sector. Model II found that the independent variables can explain 81 percent variations on capital adequacy while the beta coefficient found that all the independent variables have positive effects except medium term credit. The study concludes that credit expansion significantly relates to commercial banks soundness in Nigeria. We therefore, recommended for a well-articulated credit policies that will strengthen commercial banks soundness in Nigeria.*

KEYWORDS: Credit Expansion, Commercial Banks, Multi -Dimensional Analysis, Nigeria

INTRODUCTION

Bank plays an intermediate role in the economic growth and development of any Nation. This involves deposit mobilization and credit allocation. Credit represents the supply side of financial intermediation and has great extent to which it affects the economy. Increase in bank credit has the capacity of raising aggregate demand and also have the capacity of raising inflation. These pro-cyclical effects of commercial banks credit requires that the monetary authorities formulate policies to ensure equilibrium credit level in the economy. Credit is a financial market activity where financial institutions are empowered by law with credit functions to extend credit facilities to deficit economic units, (Akani and Onyema, 2017). The monetary authorities use credit policies to achieve macroeconomic growth. For instance, credit policies are used to achieve growth in some sectors of the economy. Credit represents the bulk of the institution's assets, while interest on the credit represents the major source of income to the financial institutions. Credit is the aggregate amount of funds provided by financial institutions empowered with credit function to individuals, business organizations and government (Timsina, 2014).

Banking system soundness is important as bank failure can undermine public confidence in the system, force a sudden contraction in money supply, curtail savings and investment, induce a

collapse of the payment system and results in severe dislocation of the real sector (Toby, 2008). The main aim is to ensure banking soundness in order to prevent costly banking system crises and their associated adverse effect on the economy. It is determined by micro prudential factors such as credit expansion, capital adequacy, asset quality and macro prudential forces such as monetary, macroeconomic and international variables (Lucky, 2017). A weak banking sector not only jeopardizes the short and long-term sustainability of the economy but can be a source of financial crisis which can result in economic crisis (Vaithelingm, 2015). A fragile banking sector places constraint on the monetary policy in the view of the lender of last resort function of Central Bank of Nigeria, for instance the banking sector crisis of 2009 resulted in injection of ₦620 billion into the economy.

Conceptually, a sound banking system is a system where the individual banks accounting for the most of the system's transactions are solvent and meet capital adequacy requirements (Toby, 2006). Banking system can also be considered sound if the banks are capitally adequate, can withstand monetary and macroeconomic shocks and fall in the composite rate of 1 and 2 as specified by the Federal Deposit Insurance Corporation. Berrios, (2013)

Credit expansion is the steady increase in the volume of credit in the economy, it is determined by monetary policy, macroeconomic and international variables (Akani and Onyema, 2017). Credit expansion can be gauged by the year-on-year percentage increase in the stock of bank loans to the private sector. The faster bank credit expands, the higher the risk of an asset bubble (Aduda, and Gitonga, 2011). Credit expansion is measured as the rapid growth of bank credit to Gross Domestic Product, rapid expansion in lending by financial institutions often occurs because of poor analysis of the quality of loan applications

Negative credit growth is likely correlated with difficulties for businesses access to credit. Ideally, loans to the private sector should grow enough to provide sufficient finance for investment, but not excessively, so as to prevent the emergence of asset price bubbles. Credit expansionary monetary policy transmission mechanism, increase in money supply can expand commercial bank credit and results in increasing non-performing loans while moral suasions of the monetary authorities can force bank to invest in sectors that are prone to credit risk. Long term credit is prone to credit risk and bank distress than short term credits. Irrespectively of importance of bank credit to the economy and banking institutions, rapid credit growth can often be considered risky. Credit booms indeed often led banks to increasingly focus and reassign staff to the generation of new loans to the detriment of credit origination, monitoring and risk appraisal. As a result, credit booms have frequently been associated with future increases in non-performing loans (NPLs) and banking sector problems. High credit growth is considered an early warning indicator of future potential banking sector problems (Fan, and Yijun, 2014).

Gieseche, 2004 opined, that rapid growth in bank credit to the private sector is a common factor associated with banking crises (Demirgüç-Kunt and Detragiache 1997, Kaminsky, Lizondo, and Reinhart 1998, and Kaminsky and Reinhart 1999). IMF (2004), estimates that about 75 percent of credit booms in emerging markets end in banking crises. Typically, credit expansions are fueled by overly optimistic expectations of future income and asset prices, combined with financial liberalization and capital inflows. A decline in income or asset prices then leads to an increase in non-performing loans and defaults. The above illustration can better be examined in the developed financial market where there is less information asymmetric in financial market and the degree of market imperfection minimal compared to the Nigeria financial market where the degree of market imperfection is close to unitary.

In the light of the above, viewpoints and controversy, this study seeks to contribute to the on-going debate by examining empirically whether there is any functional long-run relationship between credit expansion measures and commercial banks soundness in Nigerian context and Secondly to determine the direction of causality between credit expansion and commercial banks soundness within the Nigerian government. To achieve the objective of this study, the following hypotheses have been formulated to aid the analysis.

1. There is no positive long run relationship between credit expansion measures and the commercial banks soundness.
2. Credit expansion measures do not Granger cause commercial banks soundness in Nigeria

The paper is structure into five sections. Section 1 is the introduction while section 2 presents the literature review, section 3 discusses the methodology and data and section 4 presents the analysis and discussion of the empirical results, descriptive analysis and findings. Section 5 presents the conclusions and some policy recommendations.

LITERATURE REVIEW

Concept of Bank Soundness

The concept of banking system soundness is derived from the financial system soundness indicators with various studies on the micro and macro prudential determinants. A sound banking system is a system in which individual banks accounting for most of the system's transactions are solvent and meet capital adequacy requirements (Toby, 2006). Banking system is considered sound, if it is capially adequate and can withstand monetary and macroeconomic shocks in its operating environment.

Central Bank of Nigeria and banking system indicators

The Central Bank of Nigeria computes a group of macro prudential indicators for the purpose of analyzing the effects of macroeconomic variables on the financial system in order to pursue its goals of monetary and financial stability. The objective of developing the indicators is to find some early warning signals that may imply the necessity to take certain economic policy action to avoid possible crisis in the financial system. However, the use of these indicators for financial system stability assessments and monetary policy decisions is quite recent (Sunday and Sani, 2015).

Over the years, the CBN's monetary policies consists of a combination of actions aimed at ensuring monetary and price stability as well as promoting financial system stability. It therefore becomes pertinent to have coordination between actions taken towards each goal, as the achievement of each depends on the other. Appropriate monetary policy is desirous of financial stability and vice versa, and the maintenance of price stability requires a stable financial environment. Thus, policy actions taken for both goals must be consistent and mutually reinforcing.

The monetary policy in recent years was conducted against the background of the lingering effects of the liquidity crunch in the domestic economy, arising from the global financial and economic crises of 2007/2008 and internal problems in some deposit money banks in Nigeria.

Liquidity management was, therefore, geared towards improving the liquidity and efficiency of the financial market, without compromising the objective of monetary and price stability. Consequently, the monetary policy measures substantially improved liquidity conditions in the banking system and, to a large extent, ameliorated the capital erosion witnessed in the banking system in the late 2009.

The indicators compiled comprise both core and encouraged Financial Soundness Indicators for deposit takers (DTs) in Nigeria. The compilation is limited to the indicators whose underlying series are available in the statutory returns of deposit money banks (DMBs) in Nigeria. Eleven out of the twelve core FSIs are currently being compiled for the banking sector in Nigeria. These FSIs cut across four components of the indicators: capital adequacy, asset quality, earnings and profitability, and liquidity. The definition and methodology applied are explained hereunder.

Central Bank of Nigeria Banking System Soundness Indicators

Capital Adequacy Based Indicators

The three core indicators of capital adequacy are vital to the robustness of financial sector to withstand shocks to their balance sheets. Deterioration in the ratio signifies increased risk exposure and possible capital adequacy problems while an increase in the ratio means the reverse. Regulatory Capital to Risk-Weighted Assets ratio measures the capital adequacy of the banking sector in Nigeria. The numerator represents the industry position of the regulatory capital of all DMBs in the country, while the denominator is their Risk Weighted Assets (RWA) within the given period. Regulatory capital is defined in line with the provisions of the Basel Committee on Tier 1 and Tier 2 capitals². The international convention is that regulatory capital should not be less than 8.0 per cent of banks' risk weighted assets, while the required minimum ratio in Nigeria is 10 per cent for Regional and National banks and 15 per cent for International banks.

Regulatory Tier 1 Capital to Risk-Weighted Assets ratio measures the capital adequacy of the banking sector in Nigeria. The numerator represents the industry position of the Tier 1 capital of all DMBs in the country, while the denominator is their Risk Weighted Assets (RWA) within the given period. Tier1 capital comprises of paid-up capital, common stock and disclosed reserves such as retained earnings, share premiums, general reserves and legal reserves. Nonperforming Loans net of provision to capital indicator is intended to compare the potential impact on capital of nonperforming loans net of provision.

The numerator is treated in Nigeria as nonperforming when payments of principal and interest are overdue by three months or more. Specific provisions are deducted from the capital which is measured as capital and reserves reported in the sectoral balance sheet. In the alternative, however, regulatory capital can also be used. Capital to Assets (CA) tends to reveal the leverage of the deposit takers by showing the extent to which assets are funded by other funds other than those that belong to the DTs. Both capital and assets are measured as in the core FSIs.

Assets Quality and Liquidity Based Indicators

There are two core indicators for asset quality; namely: nonperforming loans to total gross loans and sectoral distribution of loans. Nonperforming Loans to Total Gross Loans indicator shows the quality of assets created by the banking system. The numerator is the total value of loans that are overdue while the total value of the loan portfolio is used as the denominator.

Loan include those financial assets created through the direct lending of funds by a creditor to a debtor through an arrangement in which the lender either receives no security evidencing the transactions or receives a non-negotiable document or instrument. Sectoral Distribution of Loans reveals the level of credit concentration and/or diversification in the loan portfolio which may be a source of vulnerability to the financial system. The numerators are lending to each of the listed sectors while the denominator is total gross loan.

There are two core indicators for liquidity: liquid assets to total assets and liquid assets to short-term liabilities. Liquid Assets to Total Assets is indicator is designed to provide an indication of the liquidity available to meet expected and unexpected demands for cash. It is calculated by imposing the core or broad measure of liquid assets on total assets. Core liquid assets comprise of currency and deposits and other financial assets that are available either on demand or within three months or less. Broad liquid asset equals the core assets plus securities that are traded in liquid markets and can be easily converted into cash with no or minimal change in value. Liquid Assets to Short-term Liabilities determines the liquidity mismatch of assets and liabilities and provides an indication of the extent to which deposit takers could meet short-term withdrawal of funds without facing liquidity problems. The core or broad measure of liquid assets is taken as the numerator while short-term liabilities are taken as the denominator. Short-term liabilities are the short-term elements of debt liabilities plus the net short-term market value of the financial derivatives.

Earning and Profitability Based Indicators

Return on Assets measures deposit takers' efficiency in the use of own assets. Net income according to the amended financial stability index guide is defined before extra-ordinary items and taxes and includes gains and losses on financial instruments as per the provision of international financial reporting standard. Return on Equity measures deposit takers' efficiency in the use of capital. In this case, net income is divided by capital. Interest Margin to Gross Income measures the relative share of net interest earnings – interest earned less interest expenses within gross income. It is calculated by using interest income as the numerator and gross income as the denominator. Net interest income is interest income (gross interest income minus provisions for accrued interest on NPLs) minus interest expense. Gross income equals net interest income plus noninterest income such as fees and commissions' receivable, gains and losses on financial instruments, pro-rated earnings from other deposit takers and other income. Non-interest Expenses to Gross Income indicates the size of administrative expenses to gross income (interest margin plus non-interest income). It is calculated by using non-interest expenses as the numerator and gross income as the denominator. Non-interest expenses cover all expenses other than interest expenses, but without provisions and extra-ordinary items. There are three encouraged set of indicators under earnings and profitability, out of which two are currently being computed for the Nigerian banking sector. Trading Income to Total Income is a measure of the relative share of deposit takers' income from financial market activities in gross income. It is an indication of reliance on market-oriented activities in gross income. It also assesses the sustainability of the DMBs' profitability. The indicator is calculated by using gains or losses on financial instruments as the numerator and gross income as the denominator.

Trading income comprises of gains and losses on financial instruments valued at market or fair value in the balance sheet. It excludes equity in associates, subsidiaries and any reverse equity investment. Gross income is as defined under core indicators. Personnel Expenses to Non-interest Expenses appraises the incidence of personnel costs in total administrative costs. It

uses personnel costs as the numerator and non-interest expenses as the denominator. Personnel costs cover the total remuneration payable by the organization in return for services rendered by the employers. Non-interest expenses are as defined under the core FSIs.

Credit Expansion

This is measured as the rapid growth of bank credit to Gross Domestic Product, rapid expansion in lending by financial institutions often occurs because of poor analysis of the quality of loan applications. In addition, a weak regulatory environment, including the presence of implicit or explicit public sector guarantees, could encourage excessive risk taking by individual financial institutions and contribute to risky credit expansions. Mortgage and other consumer lending and foreign currency loans have preceded recent lending booms, particularly in emerging market economies.

Sectoral Allocation of Loans and Advances

This is the classification of the economy into categories of sectors and sub-sectors for banking lending. For example Nigeria, the economy is classified into two major sectors: the high priority sector and others. The high priority sectors include agriculture and manufacturing industries, while the other includes the rest of the sectors of the economy.

Although lending by the central bank of Nigeria has exactly the same effect on the monetary base as an equivalent Open Market Operation, the effect of these actions on the allocation of credit is different. When the central bank Nigeria makes a loan to a depository institution, it directly allocates credit to that institution. The effect on the allocation of credit is mitigated by the fact that the total supply of credit increases the borrowing institutions obtains credit and no one loses credit. The effect of CBN lending on the allocation of credit is intensified when the CBN offsets the effect of its ending activity on the total supply of credit through Open Market Operations. In this case, borrowing institution obtains credit but the total supply of credit is unchanged. In effect, the borrowing institution is getting credit at the expense of some other individual or institution. The total supply of credit is reallocated. Historically, the CBN has offset the effect of discount window lending on the total supply of credit through Open Market Operations. However, in the wave of financial crisis during 2007 to date, the CBN has encouraged standing lending facility through the discount window and all loans to depository institutions are guaranteed at the central bank of Nigeria Discount Window. The practice of offsetting the effect of discount window lending on this monetary base means that discount window lending reallocated credit to the borrowing institution.

The effect of discount window lending on credit allocation has not been an issue for two reasons. First, the initial effect of an Open Market Operation is on depository institutions. Consequently, a discount window loan to a depository institution that is offset through Open Market Operations has the effect of reallocating credit among depository institutions. Second, and more important, discount window lending has been small historically, before 2007 when the financial crisis created liquidity crunch on the depository institutions. This was because CBN has discouraged depository institutions from borrowing at the discount window by charging penal rate. Depository institutions were expected to come to the window only when they had exhausted the relevant alternative sources of funds. But what happened was that the depository institutions refused to lend to each other because of the perceived depth of problems of these institutions. Moreover those institutions that borrowed from the CBN window were perceived as troubles. These problems were confirmed when in 2009; the CBN

had to do stress tests for the 24 banks and isolated five depository institutions as very distressed. These five depository institutions had frequented the discount window.

Structure of bank loans

Credit Structure and Bank Term Loans

Bank loans are distinguished by their different tenors, traditionally commercial banks short-term loans (trade credits) of between thirty to ninety days Onoh (2002). It is expected that within this period the borrower is expected to have sold out the goods purchased with the trade credit and paid back the loan from the proceeds. Commercial banks prefer lending short because it is safer. The distant future is full of unknown and risks. It is easier to recall a short-term loan than it is with a long-term loan. Another advantage is that trade notes and bank's acceptances being short-term borrowing instruments and self-liquidating money market instruments beef up a bank's secondary reserves and are eligible for rediscount.

Although short-term loans are renewable, experiences made during the great depression and in times of severe recessions suggest, that bank's are reluctant to renew short-term loans during depression and severe-recession period, because of economic uncertainties and the high risk of default. Onoh (2002) noted that to avoid the bad experiences made during the great depression, banks have designed new loan packages for small and big business. They are called term loans, term loan like between short-term loan of the trade type and long-term loan of the long-term investment type. Term loans have a maturity of between one to two years, but are extendable at the request of the borrower. Some term are known to have been extended for up to fifteen years. The flexibility of term loan is its main advantages. The period and the loan sum can be easily varied. Actual interest payments due to a term loan is usually higher than the nominal percentage interest rate charged by banks on principal sum borrowed. Whereas term-loan agreement allows for installment payments of the principal sum, interest charges are still based on the original principal sum borrowed and not on the unpaid balance. Although this amortizing feature of term-loan minimizes the risks of loss to the lending bank by reducing at each-loan minimizes the risks of loss to the lending bank by reducing at each payment the size of the obligation, it makes tem-loan more expensive to the borrower.

Bank Credit and Short Term Loan

Bank has a loan structure with the name short term loan. According to Ezirim and Emionu (1998) short term bank credit are credit with maturity of less than one year. In the Nigerian banking system short term credit can be define as those credits which the banks extent to its customers and expected to pay back within a period of a year. Prior to the deregulation of the economy in the last quarter of 1986, commercial banks traditionally engage in short term loans while the merchant banks and the development banks engage in long term loans. Short term loans include financial instrument such as banker's acceptance, treasury bills, commercial paper, bankers unit fund and other short arm financial instrument in the Nigerian financial system. Short term credit is extended by banks to both individual, corporate organizations and the government.

Credit Structure and Bank Credit To Corporate Organization.

In Nigeria the most attractive sector to lend apart from the government is the corporate organizations. Bank credit to corporate organizations aim to bridge the financial gap in the industries. While some industries may have more and serve as surplus economic unit others

may have less and serve as deficit economic unit. Bank credit to corporate organization can be in form of short term for working capitals or long term for project modernization or expansion. It can also be for secured or unsecured credit. Credit to corporate organization has lower risk of default.

Bank Credit Structure and Credit Risk Management Strategies

The credit risk management strategies are measures employed by banks to avoid or minimize the adverse effect of credit risk. A sound credit risk management framework is crucial for banks so as to enhance profitability guarantee survival. According to Lindergren (1987), the key principles in credit risk management process are sequenced as follows; establishment of a clear structure, allocation of responsibility, processes have to be prioritized and disciplined, responsibilities should be clearly communicated and accountability assigned. The strategies for hedging credit risk include but not limited to these.

Credit Derivatives: This provides banks with an approach which does not require them to adjust their loan portfolio. Credit derivatives provide banks with a new source of fee income and offer banks the opportunity to reduce their regulatory capital (Shao and Yeager, 2007). The commonest type of credit derivative is credit default swap whereby a seller agrees to shift the credit risk of a loan to the protection buyer. Frank Partnoy and David Skeel in *Financial Times* of 17 July, 2006 said that credit derivatives encourage banks to lend more than they would, at lower rates, to riskier borrowers. Recent innovations in credit derivatives markets have improved lenders' abilities to transfer credit risk to other institutions while maintaining relationship with borrowers (Marsh, 2008).

Credit Securitization: It is the transfer of credit risk to a factor or insurance firm and this relieves the bank from monitoring the borrower and fear of the hazardous effect of classified assets. This approach insures the lending activity of banks. The growing popularity of credit risk securitization can be put down to the fact that banks typically use the instrument of securitization to diversify concentrated credit risk exposures and to explore an alternative source of funding by realizing regulatory arbitrage and liquidity improvements when selling securitization transactions (Michalak and Uhde, 2009). A cash collateralized loan obligation is a form of securitization in which assets (bank loans) are removed from a bank's balance sheet and packaged (tranche) into marketable securities that are sold on to investors via a special purpose vehicle (SPV) (Marsh, 2008).

Compliance to Basel Accord: The Basel Accord are international principles and regulations guiding the operations of banks to ensure soundness and stability. The Accord was introduced in 1988 in Switzerland. Compliance with the Accord means being able to identify, generate, track and report on risk-related data in an integrated manner, with full auditability and transparency and creates the opportunity to improve the risk management processes of banks. The New Basel Capital Accord places explicitly the onus on banks to adopt sound internal credit risk management practices to assess their capital adequacy requirements (Chen and Pan, 2012).

Adoption of a sound internal lending policy: The lending policy guides banks in disbursing loans to customers. Strict adherence to the lending policy is by far the cheapest and easiest method of credit risk management. The lending policy should be in line with the overall bank strategy and the factors considered in designing a lending policy should include; the existing

credit policy, industry norms, general economic conditions of the country and the prevailing economic climate (Kithinji,2010).

Credit Bureau: This is an institution which compiles information and sells this information to banks as regards the lending profile of a borrower. The bureau awards credit score called statistical odd to the borrower which makes it easy for banks to make instantaneous lending decision. Example of a credit bureau is the Credit Risk Management System (CRMS) of the Central Bank of Nigeria (CBN).

THEORETICAL FRAMEWORK

Buffer Theory of Capital Adequacy

The objective of ensuring that bank capital is adequate is to withstand and absorb monetary and macro-economic shocks which bank operation is very sensitive. However, banks may prefer to hold a buffer of excess capital to reduce the profitability of falling under the legal capital requirements, especially if their capital adequacy ratio is very volatile (Ikpefan, 2013). Capital adequacy has in recent time gone beyond that of banking supervision instrument and become a monetary policy tool of achieving financial stability. Section 7 (2) of BOFIA states that any banks that fail to comply with the capital adequacy within such period as may be determined by the CBN shall be a ground for revocation of license. Section 13 states that bank shall maintain at all times capital funds unimpaired by losses in such ratio to all or any assets or to all or any liabilities or both such assets and liabilities of the bank and all its offices in and outside Nigeria as may be specified by CBN. The revocation of some banks license in 2005 after the consolidation and recapitalization reforms were reference to these section (Akani and Lucky, 2015). The buffer theory of Calem and Rob (1996) predicts that a bank approaching the regulatory minimum capital ratio may have an incentive to boost capital and reduce risk in order to avoid the regulatory costs triggered by a breach of the capital requirement. The collapse of some Nigerian Banks has been traced to high risk taking couple with poor capitalization.

Bank Run Theory

Diamond and Dybvig's paper points out that business investment often requires expenditures in the present to obtain returns in the future. Therefore they prefer loans with a long maturity that is, low liquidity. The same principle applies to individuals seeking financing to purchase large-ticket items such as housing or automobiles. On the other hand, individual savers both households and firm may have sudden, unpredictable needs for cash, due to unforeseen expenditures. So they demand liquid accounts which permit them immediate access to their deposits. The banks in the model act as intermediaries between savers who prefer to deposit in liquid accounts and borrowers who prefer to take out long-maturity loans. Under ordinary circumstances, banks can provide a valuable service by channeling funds from many individual deposits into loans for borrowers. Individual depositors might not be able to make these loans themselves, since they know they may suddenly need immediate access to their funds, whereas the businesses' investments will only pay off in the future. By aggregating funds from many different depositors, banks help depositors save on the transaction costs they would have to pay in order to lend directly to businesses. Banks provide a valuable service to both sides providing the long-maturity loans businesses want and the liquid accounts depositors want, they can charge a higher interest rate on loans than they pay on deposits and thus profit from the difference.

Diamond and Dybvig (1983) pointed out that under ordinary circumstances, savers' unpredictable needs for cash are likely to be random, as depositors' needs reflect their individual circumstances. Since depositors' demand for cash are unlikely to occur at the same time, by accepting deposits from many different sources the bank expects only a small fraction of withdrawals in the short term, even though all depositors have the right to withdraw their full deposit at any time. Thus, a bank can make loans over a long horizon, while keeping only relatively small amounts of cash on hand to pay any depositors that wish to make withdrawals. Mathematically, individual withdrawals are largely uncorrelated, and by the law of large numbers banks expect a relatively stable number of withdrawals on any given day.

EMPIRICAL REVIEW

Akani and Onyema (2017), examined the determinants of credit growth in Nigeria. Annual time series data were sourced from Central Bank of Nigeria statistical bulletin from 1981-2016. Three multiple regression models were formulated to examine the effect of macroeconomic variables, monetary policy variables and international variables on the growth of Nigeria's net domestic credit. The unit root test indicates that all the variables are stationary at first difference using the Augmented Dickey Fuller (ADF) test. The Johansen Co-integration test result shows that there exists a positive long run dynamic relationship between the dependent and the independent variables. The Granger causality test shows a uni-variate relationship from the independent to the dependent variable. From the macroeconomic variable, public expenditure, inflation rate and capital formation have a negative relationship with growth of Nigeria net domestic credit while real gross domestic product, government revenue and balance of payment have a positive impact on the dependent variable, we conclude that macroeconomic variables have significant effect on the growth of Nigeria's net domestic credit. From the monetary policy variables, treasury bill rate, interest rate and compliance to credit rules have a negative effect on net domestic credit while monetary policy rate, financial deepening and growth of broad money supply have a positive effect on the dependent variables. We also conclude that monetary policy variables have no significant relationship with the growth of net domestic credit in Nigeria. While from the international variables, exchange rate, international liquidity, foreign direct investment and openness of the economy have positive effect on net domestic credit whereas cross boarder credit and net foreign portfolio investment have negative relationship with net domestic credit. From the result, we conclude that international variables have no significant relationship with the growth of net domestic credit in Nigeria.

Greenwood and Hanson (2013), provided evidence that during credit booms in the United States, the credit quality of corporate debt issuance deteriorates and this deterioration forecasts lower corporate bond excess returns.

Giorgio and Germana (2009), aimed at analyzing whether banking changes that occurred in Italy in the last fifteen years have mined the soundness of its financial system. The theme of financial instability is closely linked to the question of capital regulate on, which is a centerpiece of government intervention because it affects banks' soundness and risk taking incentives. They show that banks follow different lending policies according to the type of customer. These results, together with the large proportion of bad loans in case of unsecured loans, may indicate the existence of potential sources of financial instability because (a) personal guarantees are a small share of loans, especially in the case of consumer households,

(b) a decline in the value of collateral held by banks in the event of a housing market weakening.

Gosh (2010) examined inter-connect 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. Coming to bank ownership, the evidence testifies that credit growth has been rapid in state-owned and de novo private banks. 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

Deniz Igan and Marcelo (2012), examined the risks to bank soundness associated with credit booms in a large set of countries. Using bank-level data in 90 countries between 1995 and 2005, they analyze the relationship between credit growth and bank soundness taking into account the potential two-way causality. They found that, while sounder banks tend to grow faster at moderate-growth periods, credit growth becomes less dependent on soundness during booms. These findings shed some light on why credit booms are often associated with financial crises

Saeed and Zahid (2016), aimed to analyze the impact of credit risk on profitability of five big UK commercial banks. For measuring profitability, two dependent variables ROA and ROE were considered whereas two variables for credit risks were: net charge off (or impairments), and nonperforming loans. Multiple statistical analyses were conducted on bank data from 2007 to 2015 to cover the period of financial crisis. It was found that credit risk indicators had a positive association with profitability of the banks. This means that even after the deep effects of credit crisis in 2008, the banks in the UK are taking credit risks, and getting benefits from interest rates, fee, and commissions etc. The results also reveal that the bank size, leverage, and growth were also positively interlinked with each other, and the banks achieved profitability after the financial crisis and learned how to tackle the credit risk over the years.

John et al. (2003), found that collateral decreases the riskiness of a given loan, and that collateralized debt has higher yield than general debt, after controlling for credit rationing. Secondly, collateral influences the screening and monitoring activities of the banks. Given the role of the banks as information providers, in the literature there are different outcomes about the impact of collateral on bank's screening and monitoring activities. The presence of a high level of collateral weakens the bank's incentive to evaluate the profitability of a planned investment project.

Rajan and Winton (1995) argued that since the bank usually has a greater incentive to ask for collateral when the borrowers' prospects are poor, a high level of collateralization might be considered as a sign that the borrower is in difficulty. Therefore, the monitoring activity should be higher in the presence of higher debt collateralization.

Longhofer and Santos (2000) argued that collateral and monitoring are complements when the bank takes senior positions on its small business loans. Finally, collateral requirements might be affected by the credit market competition. Besanko and

Thakor (1987) analyzed the role of credit market structures in the presence of asymmetric information. The Authors find that in a competitive market, the role of collateral is useful, and that low risk borrowers choose a contract with a high level of collateral and a low loan rate, whereas high risk borrowers choose a contract with a low level of collateral and a high loan

rate. In the monopolistic setting, instead, collateral plays no role unless it is sufficiently valuable to the bank to make the loan riskless.

Berger and Udell (1990) found that collateral is most often associated with riskier borrowers, riskier loans, and riskier banks, supporting the idea that observably riskier borrowers are asked to pledge more collateral to mitigate the moral hazard problem. Ono and Uesugi (2006), who analyze the small business loan market in Japan, reach similar results. The Authors find that collateral is more likely to be pledged by riskier borrowers.

Pozzolo (2004) argued that when testing the relationship between risk and collateralization, it is important to distinguish between inside collateral and outside collateral, and between real and personal guarantees. Inside collateral is physical assets owned by the borrower, and its function is to order creditors priority in case of default. Outside collateral is assets posted by external grantors, and it increases the potential loss of the borrower in case of bankrupts. Therefore, the relationship between risk and guarantees should be higher in case of outside collateral, given that inside collateral does not provide additional losses to the borrower in case of default.

Jiménez, Salas-Fumàs and Saurina (2006) found direct evidence of a negative association between collateral and the borrower's risk, thus supporting the theoretical idea of collateral used as a signaling device in an adverse selection setting. Some Authors investigate the relationship of other variables on the probability of a loan to be secured.

Chakravarty and Yilmazer (2005) argued that the overall granting process is a sequential process given by three stages: application, decision and rate setting stages. The Authors find that the lending relationship matters only in the first and second stages, such as conditional on being approved, relationships are not important in determining the loan rate.

Petersen and Rajan(1994) do not found statistical evidence that the strength of the lender-borrower relationship is correlated with cheaper credit. The Authors also find that firms that borrow from multiple banks are charged a significantly higher rate, and they do not find statistical evidence in support of alternative explanations different from the idea that multiple sources weaken relationships. As for the influence of collateral on screening and monitoring activities of banks, empirical implications of the theoretical models discussed above are different. Indeed, according to the lazy bank hypothesis, a higher screening activity should be observed when the borrowers post low collateral. Further, the average debt default should be higher when the creditor's rights are more strictly enforced given that fewer projects will be screened in this case. Rajan and Winton (1995) model predicts that collateralized debt should be observed more often in firms that need monitoring, and that changes in collateral should be positively correlated with the onset of financial distress.

Hakim and Neaime (2001) tried to examine the effect of liquidity, credit, and capital on bank performance in the banks of Egypt and Lebanon; they found that there was a sound risk management actions and application of these banks rules and laws. HosnaManzura and Juanjuan (2009) found that Non-performing loans indicator affected on profitability as measured by (ROE) more than capital adequacy ratio, and the effect of credit risk management on profitability was not the same for all the banks included in their study.

Njanike (2009) found that the absence of effective credit risk management led to occurrence of the banking crisis, and inadequate risk management systems caused the financial crisis. Kithinji (2010) indicated that the larger part of the banks' profits was influenced by other variables

other than credit and nonperforming loans. Aduda and Gitonga (2011) found that the credit risk management effected on profitability at a reasonable level. Aruwa and Musa (2012) investigated the effects of the credit risk, and other risk components on the banks' financial performance. They found a strong relationship between risk components and the banks' financial performance.

Boahene, Dasah and Agyei (2012) examined the relationship between credit risk and banks' profitability. They found a positive relationship between credit risk and bank profitability. Gakure, Ngugi, Ndwiga and Waithaka (2012) investigated the effect of credit risk management techniques on the banks' performance of unsecured loans. They concluded that financial risk in a banking organization might result in imposition of constraints on bank's ability to meet its business objectives.

Kolapo, Ayeni and Oke (2012) showed that the effect of credit risk on bank performance measured by ROA was cross-sectional invariant, though the degree to which individual banks were affected was not captured by the method of analysis employed in the study. Poudel (2012) explored the various credit risk management indicators that affected banks' financial performance; he found that the most indicators affected the bank financial performance was the default rate. Musyoki and Kadubo (2012) assessed various parameters pertinent to credit risk management as it affects banks' financial performance. They concluded that all these parameters had an inverse Investment Management and Financial Innovations, impact on banks' financial performance; however the default rate was the most predictor of bank financial performance, on the contrary of the other indicators of credit risk management.

Nawaz and Munir (2012) found that credit risk management effected on the banks' profitability, and they recommended that management should be cautious in setting up a credit policy that might not negatively affect profitability. Abdelrahim (2013) concluded that liquidity and bank size affected strongly on effectiveness of credit risk management. Adeusi, Akeke, Adebisi and Oladunjoye (2013) concluded that risk management indicators (doubt loans, and capital asset ratio) effected on banks performance. Berrios (2013) showed that less discreet lending affected negatively on net interest margin. Kaaya and Pastory (2013) showed that credit risk indicators negatively affected on the bank performance.

Ogboi and Unuafe (2013) concluded that bank's financial performance had been affected by sound credit risk management and capital adequacy. Abiola and Olausi (2014) revealed that banks' profitability had been affected by credit risk management. Singh (2013) revealed that Effective risk management was critical to any bank for achieving financial soundness. Idowu and Awoyemi (2014) revealed that credit risk management had an effect on the banks' profitability.

Li and Zou (2014) found that the indicator of Nonperforming loans had positive impact on banks profitability as measured by return on equity (ROE) and return on assets (ROA). Kurawa and Garba (2014) revealed that the variables of credit risk management effected on the banks profitability.

Kargi (2011) evaluated the impact of credit risk on the profitability of Nigerian banks. Financial ratios as measures of bank performance and credit risk were collected from the annual reports and accounts of sampled banks from 2004-2008 and analyzed using descriptive, correlation and regression techniques. The findings revealed that credit risk management has a significant impact on the profitability of Nigerian banks. It concluded that banks' profitability is inversely

influenced by the levels of loans and advances, non-performing loans and deposits thereby exposing them to great risk of illiquidity and distress.

Epure and Lafuente (2012) examined bank performance in the presence of risk for Costa-Rican banking industry during 1998-2007. The results showed that performance improvements follow regulatory changes and that risk explains differences in banks and non-performing loans negatively affect efficiency and return on assets while the capital adequacy ratio has a positive impact on the net interest margin.

Kithinji (2010) assessed the effect of credit risk management on the profitability of commercial banks in Kenya. Data on the amount of credit, level of non-performing loans and profits were collected for the period 2004 to 2008. The findings revealed that the bulk of the profits of commercial banks are not influenced by the amount of credit and non-performing loans. Chen and Pan (2012) examined the credit risk efficiency of 34 Taiwanese commercial banks over the period 2005-2008. Their study used financial ratio to assess the credit risk and was analyzed using Data Envelopment Analysis (DEA). The credit risk parameters were credit risk technical efficiency (CR-TE), credit risk allocative efficiency (CR-AE), and credit risk cost efficiency (CR-CE). The results indicated that only one bank is efficient in all types of efficiencies over the evaluated periods. Overall, the DEA results show relatively low average efficiency levels in CR-TE, CR-AE and CR-CE in 2008. Felix and Claudine (2008) investigated the relationship between bank performance and credit risk management. It could be inferred from their findings that return on equity (ROE) and return on assets (ROA) both measuring profitability were inversely related to the ratio of non-performing loan to total loan of financial institutions thereby leading to a decline in profitability.

Ahmad and Ariff (2007) examined the key determinants of credit risk of commercial banks on emerging economy banking systems compared with the developed economies. The study found that regulation is important for banking systems that offer multi-products and services; management quality is critical in the cases of loan-dominant banks in emerging economies. An increase in loan loss provision is also considered to be a significant determinant of potential credit risk. The study further highlighted that credit risk in emerging economy banks is higher than that in developed economies.

Al-Khouri (2011) assessed the impact of bank's specific risk characteristics, and the overall banking environment on the performance of 43 commercial banks operating in 6 of the Gulf Cooperation Council (GCC) countries over the period 1998-2008. Using fixed effect regression analysis, results showed that credit risk, liquidity risk and capital risk are the major factors that affect bank performance when profitability is measured by return on assets while the only risk that affects profitability when measured by return on equity is liquidity risk.

Ben-Naceur and Omran (2008) attempted to examine the influence of bank regulations, concentration, financial and institutional development on commercial banks' margin and profitability in Middle East and North Africa (MENA) countries from 1989-2005 found that bank capitalization and credit risk have positive and significant impact on banks' net interest margin, cost efficiency and profitability.

Ahmed, Takeda and Shawn (1998) found that loan loss provision has a significant positive influence on non-performing loans. Therefore, an increase in loan loss provision indicates an increase in credit risk and deterioration in the quality of loans consequently affecting bank performance adversely.

Literature Gap

The studies above has fully been examined, however none of the studies examined the problem of credit expansion and commercial bank soundness in Nigeria. The studies focused on credit risk and profitability of commercial banks. Therefore this study will examine credit expansion such as sectorial credit and credit and its effect on commercial bank soundness in Nigeria.

METHODOLOGY AND DATA

In carrying out country-specific and time-series analysis of data in financial econometrics, it is important to examine the stationarity properties of the time series. A time series is stationary if its mean, variance and auto-covariance are not time-dependent. Hence any series that is not stationary is called non-stationary. Two basic types of time series models exist and these are autoregressive (AR) models and the moving average process (MA).

An AR model is one where the current value of a variable Y depends upon only the values that the variable took in previous periods plus an error term. Thus, an AR model of order P, denoted as AR (Ip) can be expressed as:

$$Y_t = \alpha + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \dots + \phi_p Y_{t-p} + \epsilon_t \tag{1}$$

Where; ϵ_t is a white noise disturbance term. Alternatively, eq (1) can be written as:

$$Y_t = \alpha + \sum_{i=1}^p \phi_i Y_{t-i} + \epsilon_t \tag{2}$$

Where α is a constant and ϕ_1, \dots, ϕ_p are parameters of the model or using the lag operator, it becomes:

$$\sum_{i=1}^p \phi_i L^i Y_t = \alpha + \epsilon_t$$

$$Y_t = \alpha + \phi_1 L Y_t + \epsilon_t \tag{3}$$

Or $\phi(L)Y_t = \alpha + \epsilon_t$ where

$$\phi(L) = (1 - \phi_1 L - \phi_2 L^2 - \dots - \phi_p L^p) \tag{4}$$

On the other hand, if U_t is a white noise process with $E(U_t) = 0$ and $Var(U_t) = \sigma^2$, then

$Y_t = \alpha + U_t + \phi_1 U_{t-1} + \phi_2 U_{t-2} + \dots + \phi_q U_{t-q}$ (16) is a q^{th} moving average model denoted MA (q). eq. (5) can be restated as:

$$Y_t = \alpha + \sum_{i=1}^q \phi_i U_{t-i} + U_t \tag{5}$$

Thus, a moving average (MA) model is linear combinations of white noise process such that Y_t is a function of current and lagged values of a white noise disturbance process. (Brooks, 2008). Using the lag operator notation, equation (5) becomes:

$$Y_t = \alpha + \sum_{i=1}^q \phi_i L^i U_t + U_t \tag{6}$$

Or as $Y_t = \alpha + \phi(L) U_t$ where

$$\phi L = 1 + \phi_1 L + \phi_2 L^2 + \dots + \phi_q L^q \quad 7$$

However, by combining this AR (p) and MA (q) models an ARMA (p,q) model is obtained. Thus, in an ARMA model, the current value of some series Y_t depends linearly on its own previous values plus a combination of current and lagged values of a white noise error term. This can be stated as:

$$Y_t = \alpha + \phi_1 Y_{t-1} + \phi_2 Y_{t-2} + \dots + \phi_p Y_{t-p} + \phi_1 U_{t-1} + \phi_2 U_{t-2} + \dots + \phi_q U_{t-q} \quad 8$$

Where

$$E(U_t) = 0; E(U_t^2) = \sigma^2; E(U_t U_s) = 0, t \neq s \quad 9$$

It is evident from the foregoing that stationarity in a time series is a desirable property for an estimated AR model. The reason being that a model whose coefficients are non-stationary will have a non-declining effect on the current values of Y_t as time progresses which is counter-productive, empirically defective and could lead to spurious regressions.

The literature of financial econometrics is replete now with ample tests for stationarity in time series data as well as different treatments to induce stationarity. Hence, in this paper, the Augmented Dickey – Fuller (ADF) (1981), unit tests are employed to check whether the series data are stationary or not. That is, consider an AR (1) process:

$$Y_t = \alpha + \phi Y_{t-1} + \epsilon_t \quad 10$$

Where; α and ϕ are parameters of the model and ϵ_t is a white noise disturbance term. Y_t is stationary, if and only if, $-1 < \phi < 1$. However, if $\phi = 1$, then Y_t is a non-stationary series. That is, if the time series is started at some point (t), the variance of X_t increases steadily with time and goes to infinity. On the other hand, if the absolute value of ϕ is more than 1, then the series Y_t is explosive. Hence, the hypothesis of a stationary series is usually tested whether the absolute value of ϕ is strictly less than unity. Thus, for testing unit root, Y_{t-1} is subtracted from both sides of eq.(10), then we have:

$$\Delta Y_t = \alpha + \Psi Y_{t-1} + \epsilon_t \quad 11$$

Where $\Psi = (\phi - 1)$ and the null hypothesis can be tested as $H_0: \Psi = 0$. This unit root test is however only applicable where the series is an AR (1) process. For higher order serial correlation in the series, the assumption of white noise disturbance term is violated. However, the ADF test corrects for high order correlation by making the assumption of an AR(p) process as:

$$\Delta Y_t = \alpha + Y_{t-1} + \sum_{j=1}^p \Delta Y_{t-j} + \epsilon_t \quad 12$$

That is, the additional lagged terms are included to ensure that the errors are uncorrelated. Hence, if the calculated ADF statistic is less than their critical values from the fuller's table, then the null hypothesis $H_0: \Psi = 0$ is accepted and the series are non-stationary or not integrated of order zero. Thus, to induce stationarity, many time series need to be appropriately

differenced. Hence, a time series is said to be integrated of order d , if it has become stationary after differencing it d times. (Brooks, 2008).

In this paper, we examine whether the time series are co-integrated by adopting the method of Granger (1969). That is, two or more variables are said to be co-integrated if each variable individually is integrated of order one, but a linear combination of the variables is integrated of lower order say zero.

Thus, a long-run relationship between the variables is present when there exists at least one co-integrating vector. That is, if Y_{1t} and Y_{2t} are co-integrated 1 (1) so that $\int_t, 1(0)$, then this implies that there exists a long-run equilibrium between Y_{1t} and Y_{2t} to which the system converges overtime and the disturbance term can be construed as the disequilibrium error. The first step in the Engle and Granger (1987) co-integration method is to estimate the co-integrating equation.

$$Y_t = \alpha_0 + \alpha_1 X_t + U_t \quad 13$$

and then to calculate the residual

$$U_t = Y_t - \alpha_0 - \alpha_1 X_t \quad 14$$

Then we check the stationarity of the residuals. Hence, if Y and X are co-integrated the error term will be stationary and this is accomplished by testing the residuals of co-integrating regression for stationarity by performing ADF unit root tests.

Granger Causality Test

To determine the direction of causality between the variables, we employ the standard Granger causality test. (Granger, 1969). The test is based on vector error correlation model (VECM) which suggests that while the past can cause or predict the future, the future cannot predict or cause the past. Thus, according to Granger (1969). X Granger causes Y if past values of X can be used to the past values of Y . The test is based on the following regressions:

$$Y_t = \alpha_0 + \sum_{i=1}^n \alpha_1^y Y_{t-i} + \sum_{i=1}^n \alpha_{a1} X_{t-i} + U_t \quad 15$$

and

$$X_t = \beta_0 + \sum_{i=1}^n \beta_1^y Y_{t-i} + \sum_{i=1}^n \beta_{\beta_1} X_{t-i} + Y_t \quad 16$$

Where X_t and Y_t are the variables to be tested while ϵ is the white noise disturbance terms. The null hypothesis $\alpha_1 = \beta_1^y = 0$ for all 1's is tested against the alternative hypothesis $\alpha_1 \neq 0$ and $\beta_1^y \neq 0$. If the co-efficient of α_1 are statistically significant but that of β_1^y are not, then X causes Y . If the reverse is true, then Y causes X . However, where both co-efficient of α_1 and β_1^y are significant then causality is bi-directional.

The Model

Existing literature reveal that commercial banks soundness could be affected by its credit structure, investigating the impact of credit expansion on commercial banks soundness will

provide evidence on the research problem; therefore this study adopts and modify the model of (Akani and Onyema, 2017).

Linear Regression Models

The linear regression model is formulated as follows:

$$CBS = f(CEP) \quad 17$$

Where,

CBS = Commercial Banks Soundness

CEP = Credit Expansion

CEP is defined as sectorial credit and credit structure;

(that is SC + CS) 18

Thus, commercial banks soundness can be written as;

$$CBS = f(SC + CS) \quad 19$$

Therefore,

From equation 19 above changes in P is caused by changes in equity capital and debt capital disaggregating equation 17, we obtain the following;

$$CBS = f(CBA, CBM, CBSME, CBCMQ, CBCTC) \quad 20$$

$$CBS = \beta_0 + \beta_1 CBA + \beta_2 CBM + \beta_3 CBSME + \beta_4 CBCMQ + \beta_5 CBCTC + \mu t \quad 21$$

$$CBS = f(STC, MTC, LTC, CPS, NDC) \quad 22$$

$$CBS = \beta_0 + \beta_1 STC + \beta_2 MTC + \beta_3 LTC + \beta_4 CPS + \beta_5 NDC + \mu t \quad 23$$

Where;

CBS = Commercial Bank Soundness measured by capital adequacy ratio

CBA = Commercial Bank Credit to Agricultural Sector

CBM = Commercial Bank Credit to the Manufacturing Sector

CSME = Commercial Bank Credit to Small and Medium Scale Enterprises

CBCMQ = Commercial Bank Credit to Mining and Quarrying

CBCTC = Commercial Bank Credit to Transport and Communication

STC = Commercial Bank Short term Credit

MTC = Commercial Bank Medium term Credit

LTC = Commercial Bank Long term Credit

CPS = Credit to Private Sector

NDC = Net Domestic Credit

Therefore, a priori expectation ($b_1 > b_2 > b_3 > b_4 > b_5 > 0$)

Model Specification

Given the above theoretical framework, a model that seeks to examine the effects of credit expansion on commercial banks soundness in Nigeria is written as;

RESULTS AND DISCUSSION

Presentations of Results

Table 1: Level Series Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CBM	-2.137953	2.047544	-1.044155	0.3060
CBCTC	0.821281	0.275684	2.979068	0.0062
CBCMQ	4.647594	0.964814	4.817086	0.0001
CBA	2.170457	4.370768	0.496585	0.6237
CBSMES	0.228233	0.295941	0.771211	0.4475
C	11.50744	5.082284	2.264226	0.0321
R-squared	0.770543	Mean dependent var		16.37500
Adjusted R-squared	0.726416	S.D. dependent var		5.659021
S.E. of regression	2.959965	Akaike info criterion		5.175592
Sum squared resid	227.7962	Schwarz criterion		5.450418
Log likelihood	-76.80948	Hannan-Quinn criter.		5.266689
F-statistic	17.46215	Durbin-Watson stat		0.543737
Prob(F-statistic)	0.000000			

Model II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPS	0.178359	0.123470	1.444554	0.1605
NDC	0.015429	0.008444	1.827294	0.0792
MTC	-0.992402	0.530682	-1.870050	0.0728
LTC	0.317759	0.156337	2.032523	0.0524
STC	0.193624	0.031762	6.096164	0.0000
C	28.11886	13.64122	2.061315	0.0494
R-squared	0.810528	Mean dependent var		16.37500
Adjusted R-squared	0.774091	S.D. dependent var		5.659021
S.E. of regression	2.689724	Akaike info criterion		4.984115
Sum squared resid	188.1000	Schwarz criterion		5.258940
Log likelihood	-73.74584	Hannan-Quinn criter.		5.075212
F-statistic	22.24472	Durbin-Watson stat		1.220786
Prob(F-statistic)	0.000000			

Source: Extract From E-View

The estimated Regression result indicates that 77 percent and 72.6 percent variations on the dependent variable can be explained by the independent variables which are credit to various sectors of the economy. The F-statistics and F-probability proved that the model is significant. The Durbin Watson statistics shows the presence of serial autocorrelation.

Model II found that 81 percent and 77.4 percent variations in the dependent variable can be explained by the independent variables which are credit structure of commercial banks. The F-statistics and the F-probability justifies that the model is statistical strong and significant. The Durbin Watson statistics proved the presence of serial autocorrelation; this enables us to test for stationary using Augmented Dickey Fuller Test.

Table 2: Unit Root Test

Variable	ADF	1	5	10	Order of integration	Decision	Remark
CPS	-5.543276	-3.699871	-2.976263	-2.627420	1(I)	0.0001	Stationary
NDC	-4.688160	-3.679322	-2.967767	-2.622989	1(I)	0.0008	Stationary
MTC	-5.785625	-3.699871	-2.976263	-2.627420	1(I)	0.0001	Stationary
LTC	-6.208875	-3.670170	-2.963972	-2.621007	1(I)	0.0000	Stationary
STC	-7.128839	-3.699871	-2.976263	-2.627420	1(I)	0.0000	Stationary

Model II

Variable	ADF	1	5	10	Order of integration	Decision	Remark
CBS	-5.543276	-3.699871	-2.976263	-2.627420	1(I)	0.0001	Stationary
CBM	-5.385829	-3.699871	-2.976263	-2.627420	1(I)	0.0002	Stationary
CBCTC	-6.956860	-3.670170	-2.963972	-2.621007	1(I)	0.0000	Stationary
CBCMQ	-7.102667	-3.670170	-2.963972	-2.621007	1(I)	0.0000	Stationary
CBA	-5.385150	-3.670170	-2.963972	-2.621007	1(I)	0.0001	Stationary
CBSMES	-6.583002	-3.699871	-2.976263	-2.627420	1(I)	0.0000	Stationary

Source: Extract From E-View

The result of the ADF shows that all the variables are stationary at first difference. Therefore, and integrated in the order of 1(I) therefore null hypotheses of non-stationarity were rejected.

Table 4: Co-integration Test

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.668684	98.41128	95.75366	0.0324
At most 1	0.541112	65.27079	69.81889	0.1093
At most 2	0.451794	41.90229	47.85613	0.1615
At most 3	0.371999	23.86919	29.79707	0.2060
At most 4	0.174619	9.912766	15.49471	0.2875
At most 5 *	0.129350	4.155452	3.841466	0.0415

Model II

Unrestricted Co-integration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.748381	86.81670	95.75366	0.1757
At most 1	0.517949	45.42156	69.81889	0.8172
At most 2	0.336282	23.53038	47.85613	0.9518
At most 3	0.220589	11.23344	29.79707	0.9553
At most 4	0.114886	3.756923	15.49471	0.9222
At most 5	0.003187	0.095767	3.841466	0.7570

Source: Extract From E-View

The results of the co-integration indicate I co-integrating equation from trace test one co-integrating equation from model one and no co-integrating equation from model II. This implies the existence of long run equilibrium relationship between the dependent and the independent variables in model I while no long relationship in model II.

Table 5: normalized co-integration test

CBS	CBSMES	CBM	CBCTC	CBCMQ	CBA
1.000000	-1.820980	-13.63771	5.426215	-0.644949	76.72393
	(1.01869)	(7.55903)	(1.17146)	(3.76410)	(19.0531)

Model II

CBS	CPS	LTC	MTC	NDC	STC
1.000000	-0.027523	-0.359196	1.496406	-0.106722	-0.282115
	(0.11369)	(0.43327)	(1.30664)	(0.01327)	(0.03153)

Source: Extract From E-View

The inability of the co-integration test to show the direction of long run relationship makes us to test for normalized. From the model I result, credit to small and medium scale enterprise, credit to manufacturing, credit to mining and quarrying have negative long run relationship while credit to agricultural sector and transport and communication have positive long run relationship.

Table 6: presentation of Error correction Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.286705	0.545787	2.357524	0.0362
D(CBS(-1))	-0.513994	0.367064	-1.400284	0.1868
D(CBS(-2))	-0.048342	0.347445	-0.139135	0.8917
D(CBSMES(-1))	-0.136567	0.333203	-0.409863	0.6891
D(CBSMES(-2))	-0.205764	0.350257	-0.587465	0.5678
D(CBSMES(-3))	-0.185736	0.353662	-0.525181	0.6090
D(CBM(-1))	1.901653	2.452902	0.775266	0.4532
D(CBM(-2))	0.429342	2.748939	0.156185	0.8785
D(CBM(-3))	0.708889	1.668437	0.424882	0.6784
D(CBCTC(-1))	0.260675	0.362390	0.719321	0.4857
D(CBCTC(-2))	0.380778	0.350792	1.085481	0.2990
D(CBCMQ(-1))	-1.752096	2.305824	-0.759857	0.4620
D(CBCMQ(-2))	-0.357087	2.153349	-0.165829	0.8711
D(CBA(-2))	7.992839	4.544872	1.758650	0.1041
D(CBA(-3))	5.483791	5.487750	0.999278	0.3374
ECM(-1)	-0.373745	0.536488	-0.696651	0.4993
R-squared	0.549854	Mean dependent var		0.560714
Adjusted R-squared	-0.012829	S.D. dependent var		2.026919
S.E. of regression	2.039879	Akaike info criterion		4.559218
Sum squared resid	49.93329	Schwarz criterion		5.320477
Log likelihood	-47.82905	Hannan-Quinn criter.		4.791942
F-statistic	0.977200	Durbin-Watson stat		1.925007
Prob(F-statistic)	0.524655			

Model II

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.696185	0.490479	3.458221	0.0047
D(CBS(-1))	0.047416	0.228625	0.207396	0.8392
D(CPS(-1))	0.218286	0.293316	0.744200	0.4711
D(CPS(-2))	-0.332156	0.371378	-0.894389	0.3887
D(CPS(-3))	-0.323698	0.401663	-0.805893	0.4360
D(LTC(-1))	-0.240935	0.140986	-1.708925	0.1132
D(LTC(-2))	0.568442	0.535928	1.060668	0.3097
D(LTC(-3))	-0.029962	0.268512	-0.111586	0.9130
D(MTC(-1))	0.630748	0.445045	1.417269	0.1818
D(MTC(-2))	-1.488891	1.483666	-1.003522	0.3354
D(MTC(-3))	0.128290	0.738457	0.173727	0.8650
D(NDC(-1))	-0.008555	0.005765	-1.484072	0.1636
D(NDC(-2))	-8.02E-05	0.009013	-0.008897	0.9930
D(NDC(-3))	-0.004821	0.010225	-0.471547	0.6457
D(STC(-1))	-0.212132	0.079502	-2.668256	0.0205
ECM(-1)	-0.824453	0.306379	-2.690961	0.0196
R-squared	0.692469	Mean dependent var		0.560714
Adjusted R-squared	0.308054	S.D. dependent var		2.026919
S.E. of regression	1.686058	Akaike info criterion		4.178222
Sum squared resid	34.11348	Schwarz criterion		4.939482
Log likelihood	-42.49511	Hannan-Quinn criter.		4.410947
F-statistic	1.801360	Durbin-Watson stat		1.863853
Prob(F-statistic)	0.154811			

Source: Extract From E-View 9.0

The estimated error correction model above proved that model I can adjust at the speed of 37.3 percent annually, the R-square shows that 54.9 percent variations on the dependent variable can be explained by combined effort of the independent variables. Model II found that the model can adjust at 82.4m percent while the R-square shows 69.2 percent variations. The above result enables us to examine the causal relationship between the variables in the table below.

Table 8: presentation of granger Causality

Null Hypothesis:	Obs	F-Statistic	Prob.
CBSMES does not Granger Cause CBS	30	0.13910	0.8708
CBS does not Granger Cause CBSMES		0.37097	0.6938
CBM does not Granger Cause CBS	30	0.83720	0.4447
CBS does not Granger Cause CBM		0.00621	0.9938
CBCTC does not Granger Cause CBS	30	0.32656	0.7244
CBS does not Granger Cause CBCTC		3.96509	0.0319
CBCMQ does not Granger Cause CBS	30	0.34440	0.7120
CBS does not Granger Cause CBCMQ		1.97550	0.1598
CBA does not Granger Cause CBS	30	0.28579	0.7538
CBS does not Granger Cause CBA		2.51261	0.1013
Null Hypothesis:	Obs	F-Statistic	Prob.
CPS does not Granger Cause CBS	30	0.83136	0.4471
CBS does not Granger Cause CPS		1.56569	0.2288
LTC does not Granger Cause CBS	30	1.44273	0.2553
CBS does not Granger Cause LTC		1.44148	0.2556
MTC does not Granger Cause CBS	30	1.78905	0.1879
CBS does not Granger Cause MTC		1.08156	0.3544
NDC does not Granger Cause CBS	30	0.28443	0.7548
CBS does not Granger Cause NDC		0.66543	0.5229
STC does not Granger Cause CBS	30	3.95317	0.0322
CBS does not Granger Cause STC		1.34524	0.2787

Source: Extract From E-View

The table above shows the causal relationship between the dependent and the independent variables. From model I, the study found no causal relationship between the dependent and the independent variable except a bi-variate causality running from CBS to CBCTC while model II also found a bi-variate from STC to CBS.

DISCUSSION OF FINDINGS

Lending and borrowing are the primary function of commercial banks and empirical evidence has shown that the credit function of the commercial banks in Nigeria has dual effects on the performance of the banking institutions. The objective of this study was to examine the effects of credit expansion on commercial banks soundness in Nigeria using bank capital adequacy as bank soundness indicator and sectorial credit and credit structure as credit expansion measures. From the findings, model I revealed that credit to manufacturing sector have negative impact on commercial banks soundness in Nigeria. This implies that more credit to the manufacturing sector will lead to decrease in capital adequacy of the commercial banks. This finding is contrary to our expectations and could be traced to environmental factors that affect the

repayment of credits of the commercial banks to the manufacturing sector. However, it is evidenced that credit to transport and communication sector, mining and quarrying, agricultural sector and credit to small and medium scale enterprises (SMEs) have positive impact on Nigerian commercial banks soundness. These findings confirm our a-priori expectation of the results. Model II found that the independent variables can explain 81 percent. The beta coefficient shows that all the variables are positively related to commercial banks soundness except medium term credits. The positive effect of the variables confirms our a-priori expectation.

CONCLUSION

Model I found that the independent variable can explain 77 percent variations on the dependent variable while 23 percent can be explained by factors not captured in the model. From the above, the study concludes that sectorial credits of commercial banks in Nigeria have significant effect on commercial banks soundness in Nigeria.

From model II credit structure can also explain 81 percent variations on commercial banks soundness proxy by capital adequacy ratio while 19 percent could be traced to factors not captured in the regression model. From the above, this study concludes that commercial banks credit structure has significant relationship with capital adequacy indicator of the industry.

RECOMMENDATIONS

1. Commercial banks credit to manufacturing sector should be properly monitored, appraised and followed up to avoid the incident of deteriorating assets quality of the banking industry.
2. The regulatory cum supervisory authorities should consider the negative effects of commercial banks credits to the manufacturing sector in its policy to increase mandatory credit to the manufacturing sector in order to strengthening the performance of that sector
3. Credit to the manufacturing sector should be properly managed and hedged against the negative effects on commercial bank soundness in Nigeria.
4. Medium term credits such as industrial credit should also be properly monitored and appraised to avoid its negative effects on commercial banks soundness.
5. The bank lending environment should be properly scanned and its effects on commercial banks soundness. This should be properly studied by management of commercial banks in Nigeria.

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