



**ISSN 2278 – 0211 (Online)**

## The Impact of Credit Bureau on the Non-Performing Loans Situation in the Nigerian Banking Landscape

**Samuel Ufom Okon**

Chief Financial Officer, Department of Finance, Banking / Firstbank, DRC

**Abstract:**

Lending in the Nigerian banking space has continued to evolve over the years. As changes have occurred in the banking system, so has the level of non-performing loans evolved.

While the growth in non-performing loans has been as a result of various unwholesome practices in the industry, others have been as a result of global economic downturn such as the United States housing bubble in 2007 - 2008 and then the fall in demand and price of crude oil in 2016, caused another round of financial crisis.

The Nigerian banking landscape has been bedeviled with lots of non-performing loan challenges over the years. The disbursement of credit facilities in the form of advances, loans, and overdrafts by banks to corporate bodies, individuals, private and public entities occupies a critical and strategic position in the economic growth of a nation. To perform this function, Banks muster funds from the nation's surplus economic unit of the economy.

This thesis focuses on how the establishment of credit bureau has impacted the growth or otherwise of non-performing loans, lending practices and policies of banks in Nigeria.

Collected and analyzed data through primary and secondary sources. Questionnaires were administered to bank officials and the three major credit bureau companies. However, as is the case with questionnaires distributed, some were returned unanswered due to people being reluctant to furnish detailed replies.

This study sets out the theoretical background, rationalization and objectives of the study. A lot of literature reviews on lending policies and reviews of credit control in the banking industry were undertaken, the need for efficient loan administration and the causes of non-performing loans in the banking industry. A summary of the findings, recommended solution and conclusion to the research problems is presented. The outcome revealed that deficient credit analysis, as well as any negative economic impact on the country, has always played a major role in the growth of non-performing loans.

This study examined the reasons for non-performing loans in the Nigerian banking industry and the impact the credit bureau has played. The ex-post facto research design was adopted during the course of the study. Data from the Central Bank of Nigeria Statistical Bulletin and Financial Statement of banks for the period 1994-2019 were collated for the time series analysis. The five hypotheses stated were tested using the Ordinary least square regression. Non-performing loans measured by the natural logarithm of aggregate non-performing loans of banks represented the dependent variable, while gross domestic product, inflation rate, total loans and advances, total assets and bank's lending rate were adopted as the independent variables for the five hypotheses of the study. Macroeconomic variables such as exchange rate, and interest rate were also included as control variables.

The result derived from this study showed that GDP had a negative effect on non-performing loans; Bank lending rate, Inflation rate and total loans and advances all had a positive effect on non-performing loans but was insignificant; total Assets exerted a negative effect on non-performing loans and was statistically significant at the 0.05 level.

**Keywords:** Impact, credit bureau, non-performing loans, Nigeria banking landscape

### 1. Introduction

#### 1.1. Background to the Study

Credit management in the banking sector has gone through many changes in Nigeria in the last twenty years. The banking industry has lost lots of depositors' funds because the credit management process was inefficient due to the inability to analyse the credit demands by clients, the rate of interest demanded from the clients, which in some cases were really outrageous. The drive to meet unrealistic turnaround time due to the competition between banks to provide transaction efficiency, funding capability and market knowledge. To perform these roles, the bank behaved as the most important party in their transaction process, using its financial position to ensure that its associated risk is absorbed. In some cases, the bank did not possess the right subject matter expert to determine the funding type needed for a particular risk kind. It is the responsibility of the bank and the management to ensure that credit extended to clients meets the

demand as well as satisfies the needs of the locality it serves. The credit-extended debtors were funds generated from depositors of the banks and therefore required a high level of prudence in handling those funds obtained from depositors.

The establishment of a credit act by the Central Bank of Nigeria in 1990 was in a bid to rein in the banks and mandated financial institutions to render returns to the apex banks' credit risk management system for customers with an aggregate outstanding debit balance of one million nairas and above (Ijaiya G.T and Abdulraheem A (2000). This new enactment made it incumbent on Nigerian banks to upgrade their various banking applications that could assist in meeting the reporting deadline issued by the Central Bank of Nigeria. This also meant that the internal control process and the risk management strategy had to be enhanced to combat the financial weaknesses inherent in the Nigerian Banking space. The researcher of a New York-based firm said that because of this challenge, Nigerian banks had to reduce operating lending due to the growth in Non-performing loans, which hit more than \$10 billion in 2009. At the time, almost half of the Nigerian banks had their assets tied up due to delinquent facilities. This was majorly responsible for the Central Bank of Nigeria sacking eight chief executive officers and providing the \$ 4.1 billion that was needed to bail out almost 10 of the country's lenders.

In 2010, the Central Bank of Nigeria (CBN) introduced further reforms to the banking sector; this included the creation of the asset management company (AMCON), which bought over the fully provisioned non-performing loans from the banks. This move was able to boost the market, allowing banks to reveal the existence of caustic debtors in the banking system whose method involved responding to their debt obligations in some banks by borrowing from other banks. It had now become apparent to the Banks that if they had been more open in the provision of data to the database of the credit risk management system, the level of non-performing loans in the industry would not have been this high. The policy is that a credit bureau report from at least two credit bureaus has to be obtained before a facility requested can be assessed and the decision arrived at the suitability or otherwise of the customer requesting the facility.

Due to the liberalization of most economies in the world, developing countries, such as Nigeria, experienced large capital inflows due to greater demand for goods and services. The banks were the channels through which these transactions were consummated. This led to the growth of the risk assets portfolio despite no evidence of readiness for financial liberalization. This, in turn, led to the deterioration of the average asset quality of banks. It is a well-known fact that the economic cycle is linked with loan performance, and as such, whenever an economic crash occurred, loan repayment was adversely affected. This implied Non-Performing loans for the financial institutions and often banking failure.

The financial system performs a vital role in the development and growth of an economy, predominantly by serving as the support in bridging the gap between the surplus and the deficit units in the economy through its intermediation. A robust financial system that imbibes the smooth and efficient flow of the investment process lays the foundation for financial stability and sustainable economic development of a country.

In Nigeria, Somoye (2010) reviewed the performance of banks within the context of non-performing loans. The results showed that variations in non-performing loans affected the banks' earnings, followed by the risk of fluctuating interest rates resulting from monetary policy rate adjustments by the monetary policy authorities.

The studies in the Nigerian economy have concentrated on bank failures with non-performing loans as one of the major factors but without corresponding studies on non-performing loans themselves. This study is to determine if the establishment of a credit bureau has had any impact on the non-performing loans situation in the banking landscape. Therefore, the aim of this study is to analyze the sensitivity of the "Determinants of non-performing loans in the Nigerian Banking Industry" taking into cognizance the impact of the credit bureau.

### *1.2. Statement of the Research Problem*

Gross Domestic Product (GDP) has remained one of the macroeconomic factors that determine Non-Performing Loans. Despite the robust growth trend of Nigerian GDP throughout the period of this study, this should have actually improved borrowers' cash flow and, in turn, the ease in meeting repayment capabilities, but NPLs increased to an all-time high of N2, 992.80 billion in 2009. The fact that there were no result-oriented efforts put in place by the Federal Government through the Central Bank of Nigeria and other regulatory bodies to cause the positive GDP to reflect in loan repayments to close the gap created interested me. Okonjo-Iweala (2010) posited that the Country's GDP has shown positive growth, but worrisome was the lack of corresponding improvement in the welfare of the people, which supported the researcher's problem statement.

Inflation Rate (INFR) was identified as a key Non-Bank-Specific variable determinant of NPLs in the Nigerian Banking Industry. Higher inflation reduces the real value of outstanding debt, thereby enhancing the repayment capabilities of borrowers. It can also weaken the loan repayment capability of the borrowers by reducing the real income when Salaries/Wages are sticky. The inflation trend in Nigeria has been fluctuating widely, rising to 72.80% in 1995 and subsequently dropping to 3.29% in the year 2000. This generally made loan repayment plans challenging, thus, increasing NPLs. Unlike most economies, no visible attempt was made by the government to close the wide inflation gap. Previous studies supporting the researcher's position include Nkusu (2011), Khemraj and Pasha (2009), Fofack (2005) and Adebola et al. (2011). The study also identified Total Loans and Advances (TLADV) as one of the Bank-Specific factors that determine NPLs. A positive relationship exists between TLADV and NPLs such that as banks increase their loan portfolios, the rate of default in loan repayment increases. Within the period of this study, Nigerian Banks were found lending in excess of their deposit/lending threshold or ratio in order to satisfy their high appetite for profitability. The implication was an increase in NPLs. The Central Bank of Nigeria (CBN) did not close the gap, which led to reckless lending by the banks. I did not see the CBN effectively applying the relevant provisions of the Prudential Guidelines and BOFIA to control the banks' lax lending habits. In order to check indiscriminate lending, banks in Nigeria could have taken a cue from the

experience of the USA. MaGovern (1993) examined the case of the USA and noted that 'Character' has historically been a paramount factor of credit and a major determinant in the decision to lend money.

When loans are repaid, they add to the Total Assets (TAs) base of the bank and the overall NPLs are reduced. Banks face insolvency due to declining total asset values when bank borrowers are unable to repay their debts as a result of adverse shocks to economic activities. It is a sign of stability when banks increase their asset base significantly such that they can afford to raise provisions for doubtful debts and eventually write them off. Between 1994 and 2009, the Nigerian Banking Industry reflected a substantial rise in the general quality of assets and NPLs, suggesting that the quality of total assets had influenced the level of NPLs. The researcher will like to know why there was a gap resulting in the less effective reform policies prior to 1994, which could not address the issues of credit expansion emanating from the growth in the asset qualities of banks, whereas the Prudential guidelines remain an available tool to restrain the banks from injurious credit expansion. The situation escalated and eventually culminated in the failure of most banks in 2005. A rise in Bank Lending Rate (BLR) weakens the loan repayment capacity of the borrower. This goes to show that interest rate policy plays a very crucial role in the growth or decline of NPLs in Nigeria. The highest BLR in 2002 was averaged 30.19%, which was considered very high. Although the interest rate of policymakers reduced to an average of 18.36% in 2007, it rose again to an average of 30.72% in 2019.

In consideration of the above-stated problems, the researcher is tempted to ask: Why were the financial system stability managers in Nigeria and the external regulatory bodies not proactive and disciplined enough to manage this situation? This question and others will form the basis of this research.

### **1.3. Research Objectives**

The main objective of this study is to examine the bank-specific and non-bank-specific (macroeconomic) factors (or determinants) affecting non-performing loans in the Nigerian Banking Industry. Specifically, the study examines as follows:

- The effect of gross domestic product on non-performing loans in Nigerian Banking Industry.
- The effect of inflation on non-performing loans in Nigerian Banking Industry.
- The effect of total loans and advances of Banks on non-performing loans in Nigerian Banking Industry.
- The effect of total assets of Banks on non-performing loans in Nigerian Banking Industry.
- The effect of banks' lending Rates on non-performing loans in Nigerian Banking Industry.

### **1.4. Research Questions**

The research questions for this study are as follows:

- To what extent is the effect of gross domestic product on non-performing loans in Nigerian Banking Industry?
- To what extent is the effect of the Inflation rate on non-performing loans in Nigerian Banking Industry?
- How far is the effect of total loans and advances of Banks on non-performing loans in Nigerian Banking Industry?
- To what extent is the effect of the total assets of Banks on non-performing loans in Nigerian Banking Industry?
- How far does the bank's lending rate affect non-performing loans in Nigerian Banking Industry?

### **1.5. Research Hypotheses**

The Hypotheses for this study are stated in their null form as follows:

- Gross domestic product does not have a positive and significant effect on non-performing loans in Nigerian Banking Industry.
- Inflation rate does not have a positive and significant effect on non-performing loans in Nigerian Banking Industry.
- Total loans and advances of Banks do not have a positive and significant effect on non-performing loans in Nigerian Banking Industry.
- Total assets of Banks do not have a positive and significant effect on non-performing loans in Nigerian Banking Industry.
- Bank's lending does not have a positive and significant impact on non-performing loans in Nigerian Banking Industry.

### **1.6. The Scope of the Study**

The period of study covered Twenty-Five years starting from the year 1994 – 2019. The nature of this empirical research work demands the coverage of all licensed Commercial banks in Nigeria. The choice of the base year was because this period witnessed major landmarks in the banking terrain towards the end of the last century and the government's transition from Military government to usher in the third republic democracy era in 1999. It was in 1999 also that the Universal Banking Policy was introduced in Nigerian banking history.

The merchant banks and the commercial banks were merged to a common-level business playing ground. The reform marked the beginning of bigger banks and also competition. Another justification considered for the choice of this period is that it covered a period from pre-consolidation (1994-2004) to post-consolidation (2005-2019) and clearly showed the trend of activities in the industry. For example, the pre-consolidation shows 89 licensed banks in Nigeria that were consolidated into 24 banks and by the end of 2014, the number of banks had reduced further to 22 banks.

The period of study witnessed the global financial crisis, which started in late 2007 and reached its peak in 2008, with negative impacts recorded most in 2009 as well as the fall in oil prices that started in 2015 and came to its peak in 2016. This study will emphasize how the Nigerian banks reacted to the shocks of these two crises.

### *1.7 The Significance of the Study*

#### 1.7.1. Academia

Every risk asset created by a bank is a foreseen risk of non-repayment before the loan will finally become non-performing and impact negatively on the bank. A bank with a very high-risk appetite is bound to relax its risk management policies to increase its risk asset portfolio and therefore increase profit. Therefore, to overcome the risk of non-performing loans, every borrowing must be supported with adequate and acceptable collateral values.

#### 1.7.2. Policy Makers/Regulators

The study of Non-Performing Loans determinants, which considers other macroeconomic indicators and banks-specific variables, gives credence to greater significance for all Policy makers and regulators within the Financial System to take appropriate actions that will mitigate the rising level of non-performing loans in the banks. The study will be significant to key regulatory bodies like the Central Bank of Nigeria (CBN), Nigeria Deposit Insurance Corporation (NDIC), Securities and Exchange Commission (SEC), and Nigerian Stock Exchange (NSE).

#### 1.7.3. Private Sector Borrowers

Lending and borrowing is the core function of any Bank. This function is extended to all sectors of the economy. Most often, banks become averse to further lending despite high demand from borrowers and expected high-interest income. The borrowers may not understand the rationale for such adverse reactions from their bankers, which have been due largely to very high non-performing loans. Therefore, the findings from this thesis will be useful to the various private sector borrowers.

#### 1.7.4. Bank Risk Asset Management Executives

In Nigeria, studies have shown that Risk Management Practices, which are one of the major tools to hedge against asset quality depletion, are still at their rudimentary stage (Moghalu, 2013). This is evidenced by the lax implementations of Basel 1, 11, and 111. Thus the findings will be significant to the formulation of Banks' Risk Asset Management Policies, and enforce best International Practices. Advanced Loans treatments such as Loan negotiations, Loan sales, Loan derivatives and securitization will be better understood and implemented. Timely identification of potential credit default is important as high default rates lead to decreased cash flows, lower liquidity levels and financial distress (Amahalu, Abiahu, Nweze, & Obi, 2017). Compliance with various statutory laws like the Bank and Other Financial Institutions Act (BOFIA), the Company and Allied Matters Act (CAMA), and Banks Code of Corporate Governance, will be strictly adhered to in consideration of their systematic implications to the balance sheets of the banks and the economy whenever the laws are breached.

The study is significant as it will expose the major challenges facing the banks in their loan administration and control. Such challenges identified are the dearth of professionals and the absence of strategic partnerships and alliances with local and global professional bodies like Credit Risk Management Association of Nigeria (CRIMAN), Global Association of Risk Professionals (GARP); the Institute of Risk Management (IRM) in the United Kingdom, and "The International Association of Risk and Compliance Professionals (IARCP)" in the United States which creates skill and capacity gaps.

#### 1.7.5. Policy Enforcement Authorities

The post-consolidation era witnessed a restructuring and reclassification of most non-performing loans into performing status for a period within the next financial year. The Asset Management Corporation of Nigeria (AMCON) was established, among other objectives, to manage Non-Performing Loans. The delay in the implementation of the functions of the Asset Management Corporation of Nigeria caused the already restructured and reclassified Loans that were for a short period to deteriorate again. The effect impacted negatively on the balance sheet of the banks and it threatened the financial stability of the economy. The global financial crises that coincided with this development stood as a lesson to all. The significance of this study will ensure that future occurrences will be held under control.

#### 1.7.6. Government

The study will be significant in this period of globalization where the United States of America, Canada, Europe, World Bank, International Monetary Fund (IMF), and other world financial blocs like the BRICS (Brazil, Russia, India, China and South Africa) battle with regional and global financial crises, the various levels of government might intervene to rescue the financial system by considering packaging economic, financial stimulus to the citizenry through lowering lending rates, releasing more public sector funds to the banks for onward lending to borrowers, buying over the 'toxic assets' of the banks, thus, releasing much-needed liquidity to the banks and moderating the impact of the harsh global economic and financial crises, or injecting much-needed Capital to the ailing bank.

## 2. Review of Related Literature

### 2.1. Conceptual Framework

#### 2.1.1. The Concept of Non-performing Loans

A non-performing loan (NPL) is a loan in which the borrower is in default due to failure to meet the scheduled payments for a specified period. Although the exact elements of non-performing status can vary depending on the specific loan's terms, 'no payment' is usually defined as zero payments of either principal or interest. The specified period also varies, depending on the industry and the type of loan. Generally, however, the period is 90 days or 180 days.).

The various governments, having liberalized their economies, started experiencing large capital inflows with increasing demand for goods and services. The channel for these huge international banking transactions was the banks, both local and international banks. The resulting economic boom led the banks to develop a high appetite for profitability through the expansion of their total loans and advances portfolio. This led to the deterioration of average bank asset quality across the emerging economies as most of these loans could not be repaid following the impact of the cyclical nature of the individual emerging economic environment, which resulted in banking crises and often banking failures (Roland et al., 2013). The fact that loan performance is tightly linked to the economic cycle is well-known. During an economic crash, most of these loans could not be repaid as when due. The implication was Non-Performing Loans (NPLs) for the banks. Inadequate preparation for financial liberalization increased the pressure on the banks to engage in riskier activities that led to Non-Performing Loans. Other common causes of banking crisis in Nigeria include Excessive optimism about lending to rapid expanding manufacturing firms and speculative property developers, whose booming output and rapid rising collateral values gave banks a false sense of security and allowed firms to become highly leveraged.

Consequently, appendix 1.1 shows the Banks' Non-Performing Loans (NPLs) to Total Gross Loans (%) of some selected banks in Nigeria. Nigeria peaked in 2009 at 37.2 percent due to the global financial crisis. However, the trend as of 2014 had improved to 2.96 percent. This was due to the strict implementation of various financial reforms in the banking industry by the Central Bank of Nigeria. The 2016 economic recession then raised this to 12.8, 14.8 in 2017 and gradually came down to 6.03 by the end of 2019.

#### 2.1.2. Credit Bureau: Concept and Historical Evolution

Credit bureau is an organization that provides information to merchants or other businesses relating to the creditworthiness of current and prospective customers. Credit bureaus may be private enterprises or cooperatives operated by merchants in a particular locality. Users, such as credit card issuers or mortgage lenders, pay a membership charge or a fee based on the amount of service.

Cooperative credit bureaus, organized for the exchange of credit information between merchants, were known in some countries as early as 1860; most of their growth, however, occurred after World War I. Until then, the small amount of credit granted was usually based on the merchant's personal knowledge of the customer. The primary function of many of the very early credit bureaus was to maintain a list of customers who were considered poor risks. As the use of consumer credit grew and populations became more mobile, businesses turned to credit bureaus for information regarding decisions on whether to grant credit.

Credit bureaus are essential to the success of credit markets. They serve as indispensable tools used by financial institutions to support their retail lending business. Credit bureaus help address the fundamental problem in financial markets known as "asymmetric information," which means that the borrower knows the odds of repaying his or her debts much better than the lender does. The inability of the lender to accurately assess the creditworthiness of the borrower contributes to higher default rates and affects the profitability of the financial institution.

At the turn of the 21st century, the International Finance Corporation (IFC) launched the Global Credit Bureau Program (2001). The leading credit bureaus in the United States (and in many European, Latin American, and Asian countries) were Equifax, Experian, and TransUnion. Their sources of information included the merchants or other businesses that had granted a customer credit in the past, employment records, landlords, public records, newspapers, and direct investigation. Any individual who has applied for a credit or charge account, a personal loan, insurance or a job most likely has a credit record on file at one or more of these credit bureaus. The credit record, which is built and amended over time, contains information about one's income, debts, and credit payment history, as well as whether one has been sued or arrested or has filed for bankruptcy. This information leads to establishing a credit score, a numerical representation of an individual's creditworthiness.

The development of e-commerce facilitated the accumulation and distribution of information on a nationwide and worldwide basis. The threat to privacy resulting from these practices was only recently recognized. Independent agencies evaluate and compare the major credit bureaus, sometimes revealing errors and problems that have included mistaken identities, misapplied charges or debts, uncorrected errors, misleading information, and credit inconsistencies. To remedy some of these problems, the Fair and Accurate Credit Transactions Act (FACTA) was passed in the United States in 2003 to allow individuals to obtain a free copy of their credit report once a year from each of the three leading credit bureaus.

In Nigeria, a formal recognition of Credit Bureaus started in 2008 when the Central Bank of Nigeria (CBN) issued guidelines officially on their licensing and operations. The apex bank licensed three credit bureaus in 2008. These bureaus were:

- CRC Credit Bureau limited,
- CR Services Credit Bureau Plc and
- XDS Credit Bureau Limited

The CBN supported the credit bureaus by mandating all banks and financial institutions under their jurisdiction/supervision to use at least two of the three credit bureaus.

All commercial banks, MFBs, and all specialized institutions – Federal Mortgage Bank, Bank of Industry, BOA, Nigerian Mortgage Financing companies, Development Banks, leasing companies, primary mortgage institutions, asset management companies, etc. are on the credit bureau platforms.

These approved credit bureaus were mandated to do the following:

- Submit data – they were to present both positive and negative information, unlike in some countries where only negative data were present.
- Submit data – all amounts are to be reported, unlike in some countries where a minimum amount of loans is expected to be reported.
- For every credit transaction, all financial institutions are to check on the platforms of at least two credit bureaus, although some non-commercial banks/institutions run checks with only one.

According to statistics by Central Bank of Nigeria (CBN), the value of consumer loans moved from N584 billion in 2012 to N786 billion in 2015. This is a 35 percent growth in three years since it was now possible to get customers borrowing history through the credit bureau reports.

However, if we situate consumer loans as a proportion of total loans to the private sector, it gives a different picture. The total consumer loans of N584 billion in 2012 were about 7 percent of total loans to the private sector, whereas the N786 billion consumer loans in 2015 were just 6 percent of the total loans to the private sector. These statistics point to the fact that, in absolute terms, we see growth, but in relative terms, the growth is not commensurate with the overall loan growth as more and more of the loans still go to large corporate and commercial entities.

In the last three years, there has been consistent growth in the total loans to the economy, but the share that went to consumer loans has been diminishing.

The number of consumers who obtained loans moved up from three million in 2014 to about four million consumers in 2015, a 33 percent growth in one year. Therefore, it is not totally correct to say that loans to consumers have not improved in Nigeria. From my position, I know that a lot of effort has gone into the stimulation of credit to consumers and SMEs by the banks. Virtually all commercial banks now issue credit cards and they aggressively market the cards now.

To improve in granting loans to consumers, some banks have leveraged the existing credit bureau infrastructure. They obtain a lot of information from the bureau in terms of knowing who is already enjoying what, the kind of facilities being enjoyed, the performance of such facilities and, of course, the demographics of the borrowers.

Leveraging credit bureau information and its other product offerings has led to a significant scale in loan processing and approvals for banks. A lot of information has been put at the disposal of lenders in the form of many products. The essence is to enhance their decisions, armed with facts. The interesting thing is that the data in the repository of the credit bureau agencies are not just information from the commercial, merchant and mortgage banks. Most microfinance banks are scattered all over the country and some cooperative societies are now providing data to the credit bureaus.

### 2.1.3. Banking Industry Overview

This study covers a period of Twenty-Five years starting from the year 1994 – 2019. Within this period, the country has witnessed major developments in the banking industry. In 1999, the Universal Banking Policy was introduced to the Nigerian banking community.

This led to the merging of commercial banks and merchant banks to a common-level business playing ground. This reform paved the way for the emergence of bigger banks and competition. Then came the era of banking consolidation in 2005 when the minimum capital requirements of banks operating in Nigeria were moved from two million nairas to twenty-five million nairas. This led to the whittling down of banks from the pre-consolidation era of 89 licensed banks in Nigeria into 24 banks post-consolidation, and by December 2012, banks had further reduced to 22 banks only to get back to 24 banks by the end of 2014. The global financial crisis that started in late 2007 impacted the banking industry negatively by 2009 such that when stress test was introduced by the Central Bank of Nigeria (CBN), most Deposit Money Banks (DMBs) were found to be operating on negative shareholders fund. The industry indices for the banking sector were not generally favorable. The trend of non-performing loans fluctuated widely within this period of review (NDIC, 2013). Starting in 2010, the industry players embarked on internal measures to strengthen their balance sheet with a lot of improvement in the performance indices. By the end of 2014, the banking industry had rebound. For instance, the total assets of the industry grew by 26.50% from N40.83 trillion to N51.65 trillion in 2019, while total deposits increased by 12.96% from N15.32 trillion in 2018 to N17.30 trillion in 2019. Although the industry remained adequately capitalized during the year under review, there was a slight decline in the capital adequacy ratio (CAR) from 17.18% in 2018 to 16.43% in 2019, which still exceeded the prudential threshold of 10%. Overall, the banking industry was stable and safe, while its performance and level of soundness were considered satisfactory (NDIC, 2018). Within the period under review, the Banking Industry was under strict supervision by the external regulatory bodies comprising the Central Bank of Nigeria (CBN), Nigerian Deposit Insurance Cooperation (NDIC), Asset Management Company of Nigeria (AMCON), Securities and Exchange Commission (SEC) and others. These measures were aimed at promoting the safety and soundness of the banking sector and engendering depositor confidence in the system. During the period under review, AMCON successfully divested from 2 out of 3 banks it acquired from NDIC under the bridge bank failure resolution mechanism in September 2011. The two banks - Mainstream Bank Ltd and Enterprise Bank Ltd, were acquired by Skye Bank Plc and Heritage Bank, respectively.

In 2016, the economic recession in Nigeria affected the banking industry very badly. This was because virtually all banks were exposed to the oil and gas industry. The sudden drop in the price of Nigerian crude oil from an all-time high of

\$114.49 per barrel in December 2012 to \$53.77 per barrel on July 30, 2015, and subsequently, to an all-time low of \$27.82 per barrel on January 20, 2016. This meant a huge drop in the availability of foreign exchange to fund loan repayments to the banks by their customers. This inability to meet the repayment obligations gave rise to another round of non-performing loans challenge in the industry.

## *2.2. Theoretical Review*

### **2.2.1. Information Asymmetry Model**

Information asymmetry model assumes that at least one party to a transaction has relevant information, whereas the other(s) do not. Some asymmetric information models can also be used in situations where at least one party can enforce or effectively retaliate for breaches of certain parts of an agreement, whereas the other(s) cannot. The model of asymmetric information was developed in the 1970s and 1980s as a plausible explanation for common phenomena that mainstream general equilibrium economics could not explain. The theory proposes that an imbalance of information between buyers and sellers can lead to inefficient outcomes in certain markets. The model indicates that it may be complex to distinguish between good and bad borrowers (Auronen, 2003) in Richard (2011), which may result in adverse selection and moral hazard problems. The theory expounds that in the market, the person that possesses more information on a particular item to be transacted (in this case, the borrower) is in a position to negotiate optimal terms for the transaction than the other party (in this case, the lender) (Auronen, 2003) in Richard (2011). The party that knows less about the same specific item to be transacted is, therefore, in a position to make either right or wrong decisions concerning the transaction. Adverse selection and moral hazards have led to a significant accumulation of non-performing loans in banks (Bester, 1994; Bofondi & Gobbi, 2003; Leland et al., 1997).

### **2.2.2. Adverse Selection Theory**

In adverse selection models, the ignorant party lacks information while negotiating on an agreed understanding of or contract to the transaction. Adverse selection is the tendency where sellers have information that buyers do not have about some aspect of product quality. Adverse selection occurs when there is a lack of symmetric information prior to a deal between a buyer and a seller. Adverse selection causes market failure. Pagano and Jappelli (1993) showed that information sharing reduces adverse selection by improving banks' information on credit applicants. The approval of the credit bureau in Nigeria was in a bid to checkmate this lack of necessary information in order to make an informed credit disbursement decision.

### **2.2.3. Moral Hazard Theory**

In Moral Hazard models, the ignorant party lacks information about the performance of the agreed-upon transaction or lacks the ability to retaliate for a breach of the agreement. The moral hazard problem implies that a borrower has the incentive to default unless there are consequences for his future applications for credit. This results from the difficulty lenders have in assessing the level of wealth borrowers will have accumulated by the date on which the debt must be repaid and not at the moment of application. If lenders cannot assess the borrowers' wealth, the latter will be tempted to default on the borrowing. Forestalling this, lenders will increase rates, eventually leading to the breakdown of the market (Alary & Goller, 2001).

## *2.3. Empirical Framework*

### **2.3.1. Empirical Review of Non-Performing Loans**

Yixin, H. (2007), using panel data from individual banks' balance sheets, seeks to empirically assess whether NPLs will negatively affect banks' lending behavior. Their result suggests that NPLs have non-linear effects as a higher level of NPLs reduces banks' aspiration to increase lending. This is evidenced in the South East Asian countries due to distorted financial systems and government intervention. Some banks still continued with risky lending even above their threshold, while some observed their internal threshold lending policy. The Japanese banks were not negatively influenced in their lending behavior due to NPLs. There was also another finding that risk-based capital ratio played a significant role in restricting banks' risky lending as an initial intention by the Bank of International Settlement (BIS). Higher capital ratios give more incentives to increase lending than lower capital ratios when banks have less credit risk in the portfolio.

Berger et al. (1997) focused their research studies on two dimensions:

- To know why Bank and Thrift failures have been due to large proportions of NPLs prior to failure and
- To investigate the productive efficiency of financial institutions

They applied the Granger-Causality analysis to test a set of hypotheses that describes the relationships among problem loans, cost efficiency and financial capital and referred to these hypotheses with the mnemonics' Bad Luck,' 'Bad Management,' 'Skimping,' and 'Moral Hazard.' Their findings of the research hypothesis and its implications for economic policy under NPLs and cost efficiency revealed that:

- The Bad Luck Hypothesis suggests that bank failures are caused primarily by uncontrollable external events and implies that prudential regulations and supervisors could reduce the risk of failures by limiting banks' exposure to external shocks (e.g., limits on loan concentrations, allowing interregional diversification through interstate mergers and loan sales, or encouraging loan-to asset ratios) or by better-insulating banks from external shocks (e.g., requiring a high level of capital). However, under cost efficiency, the efficiency measurement should control for NPLs in cost and profit function.

- The Bad Management Hypothesis implies that the major risks facing financial institutions are caused internally. This suggests that bank supervision and research should consider cost efficiency along with other traditional predictors of troubled banks, such as loan losses and credit risks.
- The Skimping Hypothesis also identifies an internal source for risk but implies that supervisors pay special attention to banks' internal credit control procedures (e.g., loan review, collateral appraisal).
- The Moral Hazard Hypothesis implies that bank supervisors should monitor capital ratios carefully and require action to raise the ratios quickly when they become low.

Supporters of this study include Berger and Humphrey (1994) and DeYoung (1997). Hayati et al. (2007) research study supports the philosophy that variations in international and national macroeconomic variables, which are systemic (uncontrollable) in nature, and a set of unsystematic (controllable) bank-specific factors influence the formation of bank credit risk. Supported by Cebenoyan and Strahan, (2004) and Kraft and Jankov (2005), they found out that Non-Performing Loans (NPLs) is a major unsystematic factor that builds up credit risk. This factor was traced to be responsible for the Asian Financial crises of 1997. (Takayasu et al., 2000). This finding was further supported by Hassan (1993), Brewer et al. (1996), Gello et al. (1996), Berger and DeYoung (1997) and Angbazo (1997).

The major systematic, uncontrollable or external factors identified as being a significant determinant of credit risk in the banking system are economic downturns (Fisher, Gueyie and Ortiz, 2000; Ahmad, 2003 and Jankov, 2005). To further support the above assertion, Hassan et al. (1994); and Corsetti et al. (1998) maintained that during a period of external financial crises, the quality of banks' assets is likely to deteriorate, which will increase the risk of the bank and could require an increase in capital requirements, for the very weak banks.

The study used cross-sectional data from individual bank balance sheets and income statement items of commercial banks. The dependent variable was changed in NPLs to total gross loans as a measure of credit risk. The independent variables were bank-specific factors: management efficiency, loan-loss provisions, loan-to-deposit ratio, leverage, regulatory capital, funding costs, liquidity spread and total assets. They found that:

- Management quality is critical in the cases of loan-dominant banks, Leverage is irrelevant to the credit risk of banks and
- An increase in Loan Loss Provision (LLP) consists of a significant determinant of potential credit risk

Somoye's (2010) study reviewed the performance of banks within the context of Non-Performing Loans. It applied a sample size of 15 out of 24 banks in Nigeria, representing about 63 percent of the total population for the period 1997 to 2007. The study adopted a multiple regression model of the ordinary least square (OLS), while the relevant correlation coefficient was tested using 't' distribution test.

The variables include: Non-Performing Loans (dependent variable), while the independent variables were Monetary Policy Rate, Interest Rate, Credit Risk, Liquidity Risk, Market Risk, Interest Rate Risk, Earnings Risk, and Solvency Risk. The result showed that NPLs varied more strongly with earnings risk than interest rate risks and monetary policy rate. The result was found to be consistent with an earlier research by Fofack (2005) conducted on Sub-Saharan African Countries.

They found the key determinants of Non-Performing Loans to be in two parts:

The first part refers to bank-specific variables, i.e., total loans and advances, total assets, bank lending rates, strategy choices, management excellence, income margins, etc.,

The second part focuses on measurable variables, i.e., gross domestic product, interest rate, unemployment, inflation etc. and many other social variables (Louzis et al., 2010; Kalirai & Scheicher, 2002; Dash & Kabra, 2010; Bercoff, Giovanni & Grimard, 2002; Masood, 2009).

Fuentes and Maquieira (1998) argued from the study of their empirical analysis of examinations in Chile that different variables which may affect loan repayment (but are contained in the loan contract) include:

- Limitations on the access to credit,
- Macroeconomic stability,
- Collection technology,
- Bankruptcy code,
- Information sharing,
- The judicial system,
- Pre-screening techniques and
- Major changes in financial market regulation

In a study of loan losses of United States banks, McGovern (1993) argued that 'character' has historically been a paramount factor of credit and a major determinant in the decision to lend money. Relaxed lending standards, borrowers' perceptions, and unguaranteed credits are some of the actions responsible for the loan losses Banks have suffered. The author suggested that bankers should always make a fairly accurate personality-morale profile assessment of prospective and current borrowers and guarantors. Besides considering personal interaction, the banker should:

- Study the person's personal credit report,
- Try to draw some conclusions about staff morale and loyalty,
- Make trade-credit inquiries,
- Statute enquiries from present and former bankers, and
- Determine how the borrower handles stress.

In addition, banks can minimize risks by securing the borrower's guarantee, using government-guaranteed loan programs, and requiring conservative loan-to-value ratios.

Caprio and Klingebiel (1996) compiled a study based on multiple episodes of banking crises among 69 countries separated for each country for the respective time period, scope and estimated loss of crises mostly based on macroeconomic data. They found that poor management supervision, regulations, corporate governance and unnecessary government intervention are the major causes of banking sector insolvencies from 1980s to 1990s. Omar, Bellalah, Walid and Frederic (2010) argued that credit managers' contributions in terms of years of service and experience were positively correlated with Non-Performing.

Loans as decision-making of credit managers were influenced by external factors like personal gain and political corruption.

Sofolis and Eftychia (2011) used univariate regression to measure the impact of Non-Performing Loans in Romanian banking system and provided that Inflation, unemployment rate, external debt to gross domestic product, Money supply and investment with construction expenditure influence the credit risk of banking system.

Saad and Kamran (2012) concluded the outcome of their study covering the period from 1996 to 2011 by using generalized autoregressive conditional heteroskedasticity that lending rate volatility significantly but not exclusively affects Non-Performing Loans and some other macroeconomic factors. They suggested that political factors and credit policy of the banks require to be studied in depth to find the root cause of Non- Performing Loans.

### **2.3.2. Loan Classification and Provisioning in Nigeria**

The attempt to define Non-Performing Loans at the practical level for global acceptance has remained difficult because of potential changes in terms of the classification system, the scope, and contents as obtainable in various countries' financial policies. According to the International Monetary Fund Global Financial Stability Report (2012), Bank Non-Performing Loans to total gross loans is the value of Non-Performing Loans divided by the total value of the loan portfolio (including Non-Performing Loans before the deduction of specific loan-loss provisions). The loan amount recorded as non-performing should be the gross value of the loan as recorded on the balance sheet, not just the amount that is overdue.

During 1990s, Se-Hark (2003) applied three different methods in Japan to describe Non-Performing Loans. In 1993, it was based on "Banks' self-evaluation," and in 1999, it was based on "Financial Revival Laws-Based Debt Disclosure." Federal-regulated banks in the U.S. are required to apply the Bank of International Settlements (BIS) Five-tier Non-Performing Loans classification model that includes: Pass, Special mention, Substandard, Doubtful, and Loss.

In Nigeria, based on the BIS provision for some domestic adjustments, the Central Bank of Nigeria (2010) amended the prudential guidelines and approved the adoption by Deposit Money Banks of a Three-tier model of Non-Performing Loans classification that include: Substandard, Doubtful, and Loss respectively.

The amended prudential guideline explained "Performing Loan" to mean credit facilities (which include loans, advances, overdrafts, commercial papers, bankers acceptances, bills discounted, leases, guarantees, and other loss contingencies connected with a bank's credit risks) with payments of both principal and interest being up-to-date in accordance with the agreed terms.

It also explained "Non-Performing Loan" to mean credit facility in which the following conditions exist: (i) Interest or principal is due and unpaid for 90 days or more; Interest payments equal to 90 days interest or more have been capitalized, rescheduled or rolled over into a new loan. (CBN, Prudential Guideline, June, 2010).

The CBN guideline (2010) further stipulates that Non-performing credit facilities should be classified into three categories, namely, sub-standard, doubtful or lost on the basis of the criteria below and for ease of Loan Loss Provisioning (LLP):

#### **2.3.2.1. Sub-Standard**

The following objective and subjective criteria should be used to identify Sub-Standard credit facilities:

- Objective Criteria: Facilities on which unpaid principal and/or interest remain outstanding for more than 90 days but less than 180 days.
- Subjective Criteria: Credit facilities that display well-defined weaknesses, which could affect the ability of borrowers to repay, such as: inadequate cash flow to service debt, under-capitalization or insufficient working capital, absence of adequate financial information or collateral documentation, irregular payment of principal and/or interest, and inactive accounts where withdrawals exceed repayments or where repayments can hardly cover interest charges.

#### **2.3.2.2. Doubtful**

The following objective and subjective criteria should be used to identify doubtful credit facilities:

- Objective Criteria: Facilities on which unpaid principal and/or interest remain outstanding for at least 180 days but less than 360 days and are not secured by the legal title to leased assets or perfected realizable collateral in the process of collection or realization.
- Subjective Criteria: Facilities which, in addition to the weaknesses associated with substandard credit facilities, reflect that full repayment of the debt is not certain or that realizable collateral values will be insufficient to cover the bank's exposure.

#### **2.3.2.3. Lost Credit Facilities**

The following objective and subjective criteria should be used to identify lost credit facilities:

- Objective Criteria: Facilities on which unpaid principal and/or interest remain outstanding for 360 days or more and are not secured by the legal title to leased assets or perfected realizable collateral in the course of collection or realization.
- Subjective Criteria: Facilities which, in addition to the weaknesses associated with doubtful credit facilities, are considered uncollectible and are of such little value that continuation as a bankable asset is unrealistic such as facilities that have been abandoned, facilities secured with unmarketable and unrealizable securities and facilities extended to judgment debtors with no means or foreclosable collateral to settle debts.

### 2.3.3. Overview of Non-Performing Loans in Nigeria

From 1994 to 2009, the banking industry witnessed a substantial increase in the general quality of assets and in Non-Performing Loans, suggesting that the quality of total assets has a direct relationship with Non-Performing Loans. This was attributable to the non-effectiveness of previous banking reforms in addressing the issues of credit expansion emanating from the growth in the asset qualities of banks. This situation which had contributed majorly to failures in the banking industry in the 1990s, continued unabated.

Total Loans and Advances increased steadily from N94, 179.80 million in 1994 to N8, 912.14 billion in 2009 due to the competitive objective of the banks to increase profitability by expanding risk asset portfolios. Consequently, Non-Performing Loans increased from N199, 620.20 million in 2002 to N2, 922.80 billion in 2009. This situation was also reflected in the Shareholders' fund, which increased steadily from N133.87 billion in 2000 to N2, 802.00 billion in 2008 but declined suddenly to N32.80 billion in 2009 (see tables 1 and 2 in the Appendix).

However, as the nation's banking industry continued to grapple with the Challenges of the global financial crises by maintaining a cautious approach to credit expansion, the industry started witnessing a substantial improvement in the quality of assets. For instance, although total loans decreased marginally from N8,912.14 trillion in 2009 to N8,150.03 trillion in 2012, representing 8.56 percent, Non-Performing Loans declined drastically from N2,922.80 billion in 2009 to N286.09 billion in 2012, representing 90.22 percent. This improvement was attributable to the events following the banking reforms in the industry within this period. These events included the Purchase of toxic assets and margin loans in the first phase of the transactions of the then-recently established Asset Management Corporation of Nigeria (AMCON), the exercise of greater caution in the risk management practices by the banks; as well as the successful recovery efforts on some of the loans from previous financial years by some of the banks in the period immediately following the reforms.

While the industry's asset quality improved as the ratio of Non-Performing Loans to Total Loans declined from 32.80 percent in December 2009 to 3.51 percent in December 2012, representing 89.30 percent, much emphasis was placed on effective and efficient risk management practices in the banks, and strict implementation of the relevant sections of the 2006 banks Corporate Governance as amended.

### 2.3.4. Overview of Risk Management in Nigeria

Risk management is about understanding and managing the Bank's risk environment or the risks to which the Bank is exposed. Risk management practice means taking practical measures, where necessary, to ensure the identified risks are contained to acceptable levels. The general philosophy underpinning the Bank's approach is that risk management is an integral part of the management function in the organization and, as such, is the clear responsibility of management.

The Bank is committed to ensuring that effective risk management practice remains central to all Banking activities and a core management competency. The aim is to ensure that sound risk management practice is embedded in the Bank's processes and culture and that this activity makes an effective contribution to achieving the Bank's core objectives (RBA, 2013).

Risk Management Practices in the banks entail identifying, measuring, and managing risks to ensure that:

- Individuals have a clear understanding of the intricacies involved in taking and managing risks,
- Risk exposure of an institution lies within the regulatory body's acceptable limit as defined,
- Risk-taking choices of an institution align with the business strategy and defined objectives of the Board of directors,
- Risk taken is in the best interest of the institution and is worth its accruable benefits,
- Should losses arise from taking a risk, then sufficient capital should be available to cushion the loss.

The Nigerian banking industry was not left out in 2009, as it suffered a monumental backward trend in both profitability and capitalization. Available evidence by CBN (2010) showed that of the 24 banks, about 3 declared profit, those said to be near insolvent situation due to inadequate capital and risk asset depletion were 8 banks, about 70 percent slump in the capital market and most banks had to recapitalize to meet the regulatory directive.

Earlier studies have maintained that in Nigeria, the primary focus of most bank managers was profitability (which usually is a short-term objective), with little attention on risk managing practices of the quality of assets which has a better impact on the long-term sustainability of a financial institution (Aremu et al., 2010).

The Basel Committee on bank supervision in June 2004 proposed a new capital accord that focuses on establishing an international standard that banking regulators can use when creating regulations about how much capital banks need to reserve to cover credit and operational risks (BIS, 2004). The Central Bank of Nigeria (CBN), in 2005 and in compliance with the Basel accord guide, raised the capital requirement for banks to N25 billion from N2 billion with the establishment of new prudential guidelines. Applying Mergers and Acquisition (M&A) as a tool, only 24 banks emerged out of 89.

Some of the impacts of the exercise include: broadened scope of banking operations ranging from aggressive market expansion, increased capital assets, increased participation in the stock market, and increased investment in the

petroleum and real estate sector. An overall implication of this is the increased aggressive competition in the industry. The Banks were constrained to offer loans and other forms of credit, providing loans to both suitable and dubious clients. The banks' insatiable appetite for profitability caused risk management practitioners to neglect the implications of adverse selection in their risk asset Portfolio expansion. This resulted in increased risk assets from N1.21 billion in 2003 to N7.79 billion in 2008 and N8.91 billion in 2009. Non-Performing Loans increased from N260.19 million in 2003 to N463.49 million in 2008 and N2.92 billion in 2009. The ratio of Non-Performing Loans to total loans and advances increased from 6.25 percent in 2008 to 32.80 percent in 2009. The profit after tax of the banks declined from N608.88 billion in 2008 to negative N1, 373.33 billion in 2009. Consequently, the total shareholders' funds declined from N2, 802.18 billion in 2008 to N449.99 billion in 2009, representing a negative variance of 83.95 percent (NDIC, 2010).

These happenings suggested lax risk management practices in Nigerian banks, which were further exposed by the global financial crises. The stress-test implemented by the Central Bank of Nigeria in 2009 confirmed the situation to be worse than envisaged. To save the industry and the economy from imminent collapse, the CBN had to inject N620 billion to rescue 8 troubled banks, while five others were given an ultimatum to recapitalize (CBN, 2010).

The sector became unstable, leading to lost jobs by many employees and loss of funds by investors; this led to the arrest and charging to the court of some executive directors for giving loans without due process. It was discovered that most of the bad loans were used to finance private businesses of the directors, their friends and family, following the intervention of the Economic and Financial Crimes Commission (EFCC). A large proportion of the loan ended up being classified as a non-performing asset.

In Nigeria, although there has been a noticeable improvement in risk management practices across the banks following the intervention of the CBN to avert massive bank failures in 2009 and the subsequent reform measures, Moghalu (2013), asserts that risk management practice in the Nigerian financial services industry is still at a rudimentary stage.

In their contributions, Steve et al. (2013) argued that Nigerian banks are failing to meet international risk requirements after years of implementation deadlines, raising doubts about their competitiveness in the global financial market. They maintained that the banks still lag behind in meeting the basic components of risks under the Basel II Accord, while their international counterparts are ahead, looking to meet new requirements as contained in Basel III. The development thus makes the local banks less competitive internationally, despite the sector reforms.

They recognized that of the three pillars of risks upon which Basel II is built, that is, credit, market and operational, Nigerian banks have only made appreciable progress in credit risk, while the remaining two are still in infancy. Their study also revealed that most industry players acknowledge that the postponement of the implementation of the Basel III accord would provide them the opportunity of meeting up with the areas of Basel III which have not been implemented by the Nigerian banks. They argue further that the issue is not the postponement but that authorities should use the period to ensure that all the local banks are fully compliant with all other aspects of Basel II, such as Market and Operational risks.

There is also the need to review some aspects of Basel III, particularly the high capital requirement, which must have been informed by over-reaction to the 2007-2009 crises. However, the study found out that Basel III implementation may not pose any problem for Nigerian banks since they mostly hold core capital, as against banks in the developed world which have various forms of capital. Basel III is essentially on capital and liquidity. Thus, the emphasis should be on meeting up on Basel II, especially market and operation risks, which are highly unpredictable.

Basel II was initially published in June 2004 to create an international standard for banking regulators to control how much capital banks need to put aside to guard against the various risks the banks expose themselves to. Consequently, between 2004 and 2005, some banks set up enterprise risk management (ERM) departments to take care of risks generally. However, the ensuing unhealthy competition, typified by an unnecessary race for market leadership, scuttled the project.

On the other hand, Basel III, a response to the 2007-2009 banking crisis, strengthens bank capital requirements on liquidity and leverage. It ensures that banks have core capital, different from other types of capital, such as hybrid capital, as obtained in developed economies. Under the new rule in Basel III, as announced by the Basel committee, banks will only have to meet 60% of the Loan to Capital Ratio (LCR) obligations by 2015 and the full rule by 2019. The rule also states that liquidity must be enough to cover a 30-day run on insured retail deposits of 3 percent instead of 5 percent earlier proposed in 2010. The LCR essentially requires banks to hold enough liquidity to cover a run on deposits or other interruptions in short-term funding.

In conclusion, the above overview gave credence to the fact that sound risk management practices could have minimized the observed laxities as it suggests an inverse relationship with Non-Performing Loans. Risk management practices, even if flawlessly executed, do not guarantee that large losses will not occur but aims at mitigating their magnitude (Stulz, 2008; Hubbard, 2009; Jorion, 2009).

### **2.3.5. Identification and Review of Risks in Banks**

#### **2.3.5.1. Credit Risk**

Credit risk arises from the potential that a borrower will fail to perform on an obligation, which, as a rule, is expressed in non-return (fully or partially) of the debt principal and interests within the terms stipulated by the agreement.

Commercial banks participating in the lending process are subject to internal and external trials. Therefore even the best credit policy cannot ensure a lack of credit losses. The Bank must not issue unwittingly bad credits. However, it is

known that part of them might become the same in the future. The Bank's reputation may be seriously undermined by the increasing bad loans share, which in its turn may seriously affect the Bank's position in the market of credit resources. According to Basis (2002), Lender risk is undertaker credit risk. Jamaat and Asgari (2010) maintained that Credit risk is essential in the monetary of credit institutions because resources applied for facilities are in debt of the monetary institution (bank) to its shareholders and if the money does not flow, the power of giving credit and shareholders' capital return reduces.

Morton (2003) argued that NPLs could be created due to weak criteria of credit appraisal and risk acceptance without regard to limitation of bankroll, ineffective policies, and wrong functional indicators. Responsibilities in the bank should be determined clearly by ensuring that the bank's policies and procedures in risk management are managed effectively. For compatibility with integrated standards of banks for the determination of customer identity, it is important that accounts and exchange of information be controlled continuously (Basel, 2004).

Basel (1999) explained that the purpose of credit risk management is to maintain credit risk in an acceptable range. The ratio of return level banking facility to risk is maximized. The banks also must consider the relationship between credit risk and other risks. Efficient management of credit risk is a part of the comprehensive risk management method and the basic condition for the long-term success of each bank.

In practice, Nigerian Banks have been found to perform below the standard expected. The major implications have been an increase in Non-performing Loans, deterioration of assets quality and depletion of shareholders' funds. For instance, insider lending and the inability to recover such loans granted to bank directors, managers and officials were responsible for distress in the banks in the 1990s. The activities of the banking operators were contrary to the provisions of Section 20(1) (a) of Banks and Other Financial Institutions Decree (1991) - BOFIA as amended, which seeks to limit the credit exposure of banks to single obligors as a means of avoiding undue credit concentration thereby mitigating credit risk. Exceeding the single obligor limit of 20%, later amended to 35% under the Universal Banking Policy without the approval of the Central Bank of Nigeria as provided, suggests weak risk management practices in those banks.

The Director of Banks, as provided by the banks' code of conduct as amended into the Banks corporate Governance code, warns that a director shall "be disqualified if any of his loans in a bank is classified lost by the Bank Examiners of The Regulatory Authorities." The provision of the Act and those of the conduct are intended to keep directors above board in their banks' credit administration.

In practice, the warnings were flouted before the bank board credit committee that was supposed to enforce policies and practices. Investigations revealed that in most cases, the bank board credit committee was chaired by the board chairmen until the CBN stopped the practice in August 2002. The board Chairmen, by such an arrangement, reports to the directors, and, to a great extent, it effectively compromised the independent appraisal of credit that the committee would have given the board. Credit risk mitigation actions, such as the implementation of the recommendations of the bank's credit review committees and compliance with the credit management bureau of the CBN, were not effective.

The Basel Accord provides that every bank should establish an internal rating-based approach to the measurement of capital requirements. The Basel 11 Accord provides for an arrangement that allows for demands for loan supervision and a proactive credit dispute management system as the lifeblood of effective credit management. Globally, the most widely applied initiative of credit risk mitigation within the provisions of the Basel Accords is asset securitization. Asset securitization is a process by which a financial institution pools loans from individuals and sells securities backed by those loans to third parties investors (Fabuzzi et al., 1994).

The establishment of a special purpose vehicle (SPV) is an inevitable tool in asset securitization. The SPV may be a subsidiary of the originator of the loan or of the investment bank that underwrites and distributes the securities. The essence of an SPV is to create a clean and legal break in the transaction for it to be regarded as an asset sale without recourse.

In Nigeria, bank practitioners are yet to professionally understand the process and its applications. Investigations have revealed that in some banks, Bankers' Acceptances (BAs) and Commercial Papers (CPs) have been used as instruments to package their loans and classify the portfolio as off-balance sheet items. The implication is that the credit risk on such loans has not been transferred but rather succeeded in understating the volume of loans and deposits of their banks. Other off-balance sheet engagements are commercial banks placing huge amounts of deposits with discount houses for on-lending or investment in commercial papers. Such placements are sometimes presented as off-balance sheet items by the discount houses. The implication is that the discount houses are not the primary obligors but the banks. In the event of default, the bank would be in trouble because it would not have direct access to the obligors (Owojori et al., 2011). A good risk management practice should be able to analyze this type of engagement and take measures to shield the banks from envisaged losses. However, Nigerian banks have been enjoined to seek ways of setting up SPVs for the dual benefit of credit risk mitigation and deepening the financial market (Umoh, 2002).

### 2.3.5.2 Liquidity Risk

Liquidity risk relates to the risk of insufficient liquid assets to meet the Bank's obligations as they fall due or the Bank having to meet the obligations at excessive cost. This risk which characterizes the banks' stability, arises from mismatches in the timing of cash flows. Funding risk (a form of liquidity risk) arises when the liquidity needed to fund illiquid asset positions cannot be obtained at the expected terms and when required.

The objective of the Bank's liquidity risk management is to ensure that all anticipated funding commitments can be met when due and that access to funding sources is coordinated assuredly in line Basel II provisions. Basel II is structured around three 'pillars': minimum capital requirements, supervisory review process and market discipline. Thereafter there have been several press releases by the committee aimed at increasing capital requirements and improving the

measurement of capital. Though there has been no regulatory requirement for banks in Nigeria to comply effectively, some Banks on their own have made substantial progress in compliance. The successful conclusion will allow the Banks' capital measurement to reflect credit, market and operational risk exposures on the assets of the Bank.

While analyzing liquidity risk, specific attention should be paid to credit risk and deposit concentration or concentration of the loans received by the Banks. The Banks are expected to have expert knowledge of the risk caused by such concentration. While analyzing the risk of liquidity loss, the level of dependence on different bank creditors (interbank market, Central Bank of Nigeria, and other clients like legal agents and natural persons) should be taken into account as well as their level of sensibility to the situation at the money market. Changes in the structure of the attracted funds in the total volume of the Bank's liabilities in comparison with preceding reporting periods should be analyzed. The structure of the Bank's assets and liabilities and their correspondence by terms ensure meeting by the Bank of its liabilities and guarantee the necessary level of income to its investors.

Banks make money when loans are granted at rates above the cost of funds plus a margin and when the amounts loaned are returned at the maturity of the loan to the bank. Where loanable funds are not returned to the bank, such banks face the risk of illiquidity and insolvency. It is in an effort to prevent banks' illiquidity and insolvency that BOFIA requires in Section 20(2)(a) that no bank without CBN approval in writing should permit a director's loan or a loan to his/her related company that is unsecured to be non-performing. Also, the CBN's Code of Corporate Government requires in Section 6(1)(8) that a director whose facility remains non-performing for more than one year should cease to be on the bank's board and could be blacklisted from sitting on the board of any other bank. Lessons from the failed banks in Nigeria revealed that these law provisions that constitute sound risk management best practices were not adhered to.

### 2.3.5.3 Operational Risk

The Basel II Committee defines operational risk as: "The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events." However, the Basel Committee recognizes that operational risk is a term that has a variety of meanings and therefore, for internal purposes, banks are permitted to adopt their own definitions of operational risk, provided that the minimum elements in the Committee's definition are included.

Operational risk is the broad discipline focusing on the risks arising from the people, systems and processes through which a company operates. It can also include other classes of risk, such as fraud, legal risk, regulatory compliance risk, financial crime risk, people risk, property, technology, vendor, financial, and physical or environmental risks.

Operational risk management differs from other types of risk because it is not used to generate profit (e.g., credit risk is exploited by lending institutions to create profit, market risk is exploited by traders and fund managers, and insurance risk is exploited by insurers). They all, however, manage operational risk to keep losses within their risk appetite - the amount of risk they are prepared to accept in pursuit of their objectives. In practical terms, this means that organizations accept that their people, processes and systems are imperfect and that losses will arise from errors and ineffective operations. The size of the loss they are prepared to accept because the cost of correcting the errors or improving the systems is disproportionate to the benefit they will receive determines their appetite for operational risk.

- Major operational risks faced by the Banks are financial crimes (internal fraud, external fraud and money laundering). Each incident is analyzed, control failures identified and new controls designed. Key counter-measures put in place in some banks include:
  - Continuous staff training,
  - Know Your Customer (KYC) drive and background checks on employees,
  - Issuance of appropriate and deterrent circulars,
  - Job rotation and segregation,
  - Banks' Customers to be informed of transactions passing through their accounts via SMS alerts,
  - Enforcement of stiff disciplinary measures, including prosecution of fraudulent staff,
  - Installation of panic alarm system, CCTV, deadman doors, etc

Failure to manage operational risk effectively often results in significant financial losses, regulatory fines or censure, reputational damage, brand erosion or even the loss of banking license, all of which directly impact shareholder value. JP Morgan Chase & Co (JPM) had to pay regulatory penalties valued at \$920 million in addition to settling U.S and U.K of \$6.2 billion trading loss. The Executives of JPM, headed by Jamie Dimon, admitted violating securities laws in 2012 as top managers withheld information from the board. Analysts viewed this as a "pattern of misconduct" by maintaining poor internal controls, failing to keep their board informed and allegedly misleading regulators.

The aim of operational risk strategy in any bank will be to minimize the impact of operational risk on its shareholders' value through the following strategies:

- Reduce the likelihood of occurrence of unexpected events and related costs by managing the risk factors and implementing loss prevention or reduction techniques to reduce variation in earnings;
- Minimize the impact of unexpected and catastrophic events, including related costs, through risk financing strategies that support the Banks' long-term growth, cash flow management and balance sheet protection; and
- Make all managers responsible for managing operational risk and thus minimize actual or potential losses; however, recognize that some losses, such as operational errors, are inevitable and are normal business costs but ensure these costs are kept within acceptable levels and potential losses are minimized.

In Nigeria, Banks are expected to render monthly returns on frauds and forgeries and also notify the corporation about terminations and dismissals of staff in compliance with the requirement of sections 39 and 40 of the NDIC Act No.22 of 1988 (as amended). Insured banks are expected to provide fidelity bond insurance to cover frauds and forgeries committed by banks' staff in compliance with Section 32 of the Act. During the year 2003, reported cases of fraud

increased from 796 to 850 representing about 6.96 percent, with an actual monetary loss of N9.384 billion compared with N857 million provisioned. The incidences of fraud and forgeries worsened after consolidation took different dimensions such as forged cheques, granting of unauthorized credits, posting of fictitious credits, fraudulent transfers/withdrawals, Cheque and cash defalcation, loss of money to armed robbers, and outright theft of money. The banks could not recover much based on poor compliance with fidelity insurance coverage (Awojori et al., 2011). The implication threw most banks into insolvency, resulting in bank failures as recorded from 1994 to 2000, revocation of licenses of 34 banks, and in January 2006, the licenses of additional 14 banks were revoked (Umoh, 2002).

All these suggest that operational risk practices in Nigerian banks are not yet strong to keep pace with the global system and human thinking sophistications. Effective and efficient internal control should be the major instrument of operational risk management. Its assignment consists in being a preventive tool and not stating facts of past events.

#### 2.3.5.4. Reputational Risk

Reputational risk refers to a risk of loss resulting from damages to a firm's reputation, lost revenue, or destruction of shareholder value, even if the company is not found guilty of a crime. Reputational risk can be a matter of corporate trust but also serves as a tool in crisis prevention. The Basel 11 framework explains reputational risk as the risk arising from negative perception on the part of customers, counterparties, shareholders, investors, or regulators that can adversely affect a bank's ability to maintain existing or establish new business relationships and continuous access to resources of funding such as through the interbank or securitization markets.

The international association of risk and compliance professionals (IARCP) maintains that reputational risk is multidimensional, reflects the perception of other market participants, and it is present throughout the organization's existence. Exposure to reputational risk is essentially a function of the adequacy of the bank's internal risk management practices and the manner and efficiency with which management responds to external influences on bank-related transactions.

Sound risk management practices are necessary to support supervisory and market participants' confidence in banks' assessments of their risk profiles and internal capital adequacy assessment. Managing reputational risk should include:

- Educate shareholders, employees, customers and suppliers by explaining the importance of reputational risk and what they have to do and avoid,
- Strong and consistent enforcement of controls from the top, board and senior management to the lowest cadre;
- Continuous monitoring of threats to reputation,
- Establishment of a crisis management plan and team,
- Stress testing and reporting of the results.

However, such trust and confidence are bound to suffer, if any or all of the following take place:

- The bank levied excessive charges on customers: J P Morgan Chase & Co. agreed to pay an additional \$389 million in penalties and restitution to settle two regulators' claims that it unfairly charged customers for credit-monitoring products, bringing the day's total cost to more than \$1.3 billion from earlier \$920 million.
- Customers are unduly delayed in the course of effecting deposits/withdrawals and other transactions,
- The staff of the bank is rude towards customers,
- The bank has known incidents of fraud, forgeries and unwholesome insider dealings: Worried by the new trend of insider dealings threatening the gains of the banking sector reforms, the Central Bank of Nigeria (CBN) has directed that henceforth all facilities to board members and staff above N1 million be disclosed in the Credit Risk Management System (CRMS). The CRMS, which is a central database for credit information on borrowers, established by the CBN Act No.24 of 1991 (Sections 28 and 52) as amended, made it mandatory for all banks to render returns to the CRMS in respect of all credit facilities of N1 million and above.
- There is publicized instability in the board and management of the bank and
- The bank is known not to be a good corporate citizen obeying laws only

Some banks render fictitious profits by capitalizing certain expenses, like hotel bills, etc., as fixed assets and amortizing the figures over a period of repayment. Investigations further revealed that in the past, certain loans and advances had been packaged as Bankers' Acceptances (BAs) and Commercial Papers (CPs). The implication is to recognize them as off-Balance Sheet items to record a lower non-performing loan portfolio. These are unethical practices that often result in the high vulnerability of reputational risk towards the erosion of public confidence, run-on deposits, shareholders' funds and bank failure.

#### 2.3.5.5. Market Risk

Market risk is the risk of losses in positions arising from movements in market prices. Some market risks include:

- Equity risk - the risk that stock or stock indices, prices and/or their implied volatility will change.
- Interest rate risk - the risk that interest rates (e.g., Nibor, Libor, Euribor, etc.) and/or their implied volatility will change.
- Currency risk - the risk that foreign exchange rates (e.g., Naira/USD, EUR/USD, EUR/GBP, etc.) and/or their implied volatility will change.
- Commodity risk - the risk that commodity prices (e.g., corn, copper, crude oil, palm oil, etc.) and/or their implied volatility will change.

The 1998 Basel I Accord amendment provides a menu of approaches for determining market risk capital requirements, ranging from simple to intermediate and advanced approaches. Under the advanced approach (the internal model approach), banks are allowed to calculate the capital requirement for market risk using their internal models. The Basel II framework implemented globally in 2008 enhanced the requirements for market risk management by including oversight rules, disclosure, management of counterparty risk in trading portfolios, etc.

#### **2.3.5.6 Human Resources Risk**

This is the risk that a bank may not have adequate human resources in terms of number, qualification and experience to pursue its mandate. The risk should also cover losses to the bank occasioned by errors of commission and omission by staff. In addition, it includes losses to the banks arising from outright theft, fraud and forgeries. Human resources risk in the Nigerian banking industry caught the attention of many people, perhaps for the industry in 1987 (Awojori et al., 2011).

The CBN/NDIC (1995) study, which conducted the manpower survey of the banking industry in 1991, found out the dearth of skilled manpower, high labour turnover, staff poaching and recruitment of inexperienced staff as responsible factors for the banking failure in Nigeria in the 1990s. In the commercial banks surveyed, professional staff defined as those who were members of professional bodies such as the Chartered Institute of Bankers of Nigeria (CIBN) and the Institute of Chartered Accountants of Nigeria (ICAN) represented only 1.8% of total staff, whilst in the merchant banks the proportion was as high as 10.4%. Similarly, staff with degrees was only 9.3% of total staff in the commercial banks surveyed, whilst, in the merchant banks, the proportion was as high as 34.7%. Thus, over-ambitious young bankers, bank workers, and those with proven bad records were allegedly recycled into the system. In this scenario, much value was not being added to the banking industry. The Human resources department of the banks embraced many challenges before them with the mandate to recruit and train graduate employees into the banks (NDIC, 1991).

#### **2.3.6. Risk Management and Non-Performing Loans**

Risks in financial services are larger in scope and scale than ever before. Along with revenue maximization and operational cost minimization, risk management has moved to center stage in defining superior performance. Differences in risk management philosophy and technique can produce prosperity, mediocrity, or failure. No senior management of today's financial institutions can perform its function without a vastly expanded understanding of the dimensions of risk and the various tools to manage it. Firms that had been performing well suddenly announced large losses due to credit exposures that turned sour, interest rate positions taken, or derivative exposures that may or may not have been assumed to hedge balance sheet risk. In response to this, banks have almost universally embarked upon an upgrading of their risk management and control systems for the reduction of Non-Performing Loans. The Central Bank of Nigeria brings its best effort to improve risk management continuously to reduce Non-Performing Loans, which is one of the major problems of banks as it impacts profitability. Risk management is recognized in today's business world as an integral part of good management practice. In its broadest sense, it entails the systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, assessing, treating and monitoring risk.

#### **2.4. Review Summary**

##### **2.4.1. Gross Domestic Product (GDP)**

According to Farhan et al. (2012), there is significant empirical evidence of negative association between growth in gross domestic product and non-performing loans such as Louzis, Vouldiz and Metaxas (2011), Khemraj and Pasha (2009), Salas and Saurina (2012), Rajan and Dhal (2003), Fofack (2005) and Jimenez and Saurina (2005). The negative relationship between these two variables has been explained in literature as well. Growth in the GDP usually increases the income, which ultimately enhances the loan repayment capability of the borrower, which in turn contributes to lower bad loans and vice versa (Khemraj & Pasha, 2009). Bofandi and Ropele (2011), Demirguc-Kunt and Detragiache (1998), Hardy and Pazarbasioglu (1998) and Shu (2002) all found GDP to be negatively related to Non-performing loans and significant as well.

##### **2.4.2. Inflation Rate (INFR)**

Inflation has been considered a determinant of Non-performing loans in developed and emerging markets. Nkusu (2011) has explained that the relationship between both variables can be positive or negative. According to the author, inflation affects the loan repayment capacity of borrowers positively or negatively; higher inflation can enhance the loan repayment capacity of borrowers by reducing the real value of outstanding debt. Increased inflation can also weaken the loan repayment capacity of the borrowers by reducing the real income when salaries/wages are sticky. Moreover, by highlighting the role of inflation in the presence of variable interest rates (or bank lending rates), Nkusu further explains that in this scenario, inflation reduces the debt servicing capacity of the loans as lenders adjust the lending interest rates to adjust their real return. According to literature, the relationship between inflation and the non-performing loan can be positive or negative depending on the economy of operations (Farhan et al., 2012).

The present study finds a positive relationship between the inflation rate and Non-performing loans in Nigeria over the past two decades. Other studies with similar results include Khemraj and Pasha (2009), Fofack (2005), Hoggarth, Sorensen and Zicchino (2005), Vogiazas and Nikolaidou (2011), Shu (2002), Adebola et al. (2011), Muniappan (2002), Sofolis and Sftychia (2011).

#### 2.4.3. Total Loans and Advances (TLADV)

Higher total loans and advances over successive years may be an indication of indiscriminate lending, which in turn heightens the likelihood of repayment default. Our study of the literature finds a positive and highly significant relationship between Total Loans and Advances (TLADV) and Non-Performing Loans (NPLs). Dash and Kabra (2010), Louzis, Vouldis and Metaxas (2010) and Masood (2009) are examples of studies that incorporated the effect of TLADV on NPLs and found strong associations between both variables. In order to check indiscriminate lending, banks can take a cue from the experience of the USA. McGovern (1993) examined the case of the USA and noted that 'character' has historically been a paramount factor of credit and a major determinant in the decision to lend money. Banks have suffered loan losses through relaxed lending standards, unguaranteed credits, and the borrowers' perceptions. In addition to considering personal interaction, banks should:

- Study the intending borrower's personal credit report
- Do trade-credit enquiries
- Statute enquiries from present and former bankers, and
- Determine how the borrower handles stress

In addition, banks can minimize risks by securing the borrower's guarantee, using government-guaranteed loan programmes, and requiring conservative loan-to-value ratios.

#### 2.4.4. Total Assets (TAs)

Our study of the literature finds a negative relationship between Total assets and Non-Performing Loans (NPLs) in the banks. Banks face insolvency due to declining total asset values when bank borrowers cannot repay their debt due to adverse shocks to economic activity (Demirguc-Kunt & Detriagiache, 1995; Hardy & Pazarbasioglu, 1998). Thus when loans are repaid, they add to the banks' assets base and reduce overall non-performing loans. Arellano (2006) also found total assets to be a key determinant of non-performing loans. As noted earlier, it is a sign of stability when banks increase their assets base significantly such that they can afford to raise provisions for doubtful debts and eventually write these off. Thus, the net effect of rising total assets in the banking industry is a reduction in the total value of non-performing loans. The findings are in line with Hu et al. (2006), who employed total assets as a proxy for bank size and found that bank size is negatively related to non-performing loans in Taiwan.

#### 2.4.5. Bank Lending Rate (BLR)

The study finds a direct relation between Bank lending rates and Non-Performing loans. This implies that NPLs are higher during periods of higher lending rates and lower during periods of lower lending rates, with everything else remaining the same. The finding is consistent with numerous studies. Lawrence (1995) noted that banks charge higher interest rates to riskier clients and if a high-interest rate is charged to those borrowers who already have substandard records to repay the loans is also a factor contributing to the growth of NPLs (Farhan et al, 2012). The result contrasts, however, with the findings of Bofondi and Ropele (2011), who found lending rates to be negatively associated with NPLs in Italy, perhaps because they used quarterly data instead. The fact that lending rates are an essential determinant of NPLs is also proved by Berge and Boye (2007), who found that NPLs are highly correlated with the lending rates for the Nordic banking system. This singular variable has been termed 'primary determinant' of NPLs or bad loans and all with evidence of a positive relationship (Louzis, Vouldis & Metaxas, 2011; Nkusu, 2011; Adebola, Yosoff & Dehalan, 2011; Berge & Boye, 2007). A rise in lending/interest rate weakens the loan repayment capacity of the borrower. Therefore, non-performing loans are positively associated with the interest rate. This goes to show that interest rate policy plays a very crucial role in the growth or decline of NPLs. Hoque and Hossain (2008), Bloem and Gorter (2001), Asari et al. (2011), Dash and Kabra (2010), Collins and Wanjau (2011) all found that high lending rates enhance the debt burden on the borrower and cause loan defaults or that banks with aggressive lending policies charging high-interest rates from the borrowers incur greater non-performing loans. However, perhaps the result that is close to that of the present study is Espinoza and Prasad (2010), who also did not find a statistically significant relation (Farhan et al., 2012). In Nigeria, risk management policies are still at a rudimentary stage as the banks still lag behind in meeting the basic components of risks under the Basel 11 accord, whereas their international counterparts are ahead, looking to meet new requirements as contained in the Basel 111. The development, thus, makes the local banks less competitive internationally despite the sector reforms (Blaauw, 2009; Moghalu, 2013; Steve et al., 2013).

### **3. Research Methodology**

#### *3.1. Research Design*

The study is based on an ex-post-facto research design. Research is a systematic way of finding out about the worth or otherwise of a given subject matter. It is a process of acquiring relevant information to solve a given problem (Ogunniyi, 1992: 2). Research Methodology refers to the procedure of collecting the relevant data, arrangement and analysis of information to actualize the research purpose. It also considers the various sources adopted in gathering information relevant to the study. The setting of the study, area, population, sources and data collection methods are described in this Chapter. The data collection tools, their validity and reliability, and the description of data analysis models and processing are also explained. The relationships between the independent and dependent variables are evaluated in this research based on extensive literature background.

A research is ex-post-facto, where it aims at measuring and establishing the relationship between one variable and another or the impact of one variable on another, in which the variables involved are not manipulated by the researcher

because they already exist (Onwumere, 2005). An ex-post-facto research determines the cause-effect relationship among variables. It is most useful in investigating variables that cannot be observed experimentally, such as those studied in this work. It is the type of research involving events that have already taken place (Onwumere, 2009). Kerlinger et al. (1986) explained that in the context of social science research, an ex-post facto investigation seeks to reveal possible relationships by observing an existing condition or state of affairs and searching back in time for plausible contributing factors.

### *3.2. Nature and Sources of Data*

The primary aim of the research is concerned with the acquisition of valid knowledge of our environment, people, things and situations around us to harmonize with it (Ogunniyi, 1992:3). Data is raw material input into many research, and the nature of data for any study depends largely on the objective of the research and the type of research being undertaken (Onwumere, 2005). The nature of this empirical research work is secondary and demands the coverage of all lending banks in Nigeria whose audited annual accounts are published and returns rendered to the Central Bank of Nigeria (CBN). To overcome the difficulty of collating data from individual banks' audited financial reports for the period under study, aggregate and comparative figures were collated from the annual accounts and publications of the Nigerian Deposit Insurance Corporation (NDIC), the Central Bank of Nigeria (CBN) Statistical Bulletin and other publications. The study relied on these institutions' publications to source and crosscheck required data that covers the period 1994 to 2019.

### *3.3. Model Specification*

#### 3.3.1. The Models

Based on the review of literature, it is clear that there is extensive international evidence that suggests that non-performing loans may be explained by both macroeconomic and bank Specific factors. In this study, we employ a reduced form of the econometric model that is similar to Jimenez and Saurina's (2005) and Pasha and Khemraj's (2009) models. The model is depicted below:

$$\begin{aligned} \ln NPL_{Ai,t} = & \beta_0 i + \beta_1 \ln NPL_{Ai,t-1} \\ & + \beta_2 \ln L_{Ai,t} + \beta_3 \text{SIZE}_{i,t} + \beta_4 \Delta LOANS_{i,t} + \beta_5 \Delta LOANS_{i,t-1} + \beta_6 \Delta LOANS_{i,t-2} \\ & + \beta_7 \ln RIR_t + \beta_8 \ln RIR_{t-1} + \beta_9 \ln INF_t + \beta_{10} \ln INF_{t-1} \\ & + \beta_{11} \Delta GDP_t + \beta_{12} \Delta GDP_{t-1} + \beta_{13} \ln REER_t + \beta_{14} \ln REER_{t-1} + \eta + \varepsilon_i \\ i = 1 \dots N, t = 1 \dots \end{aligned}$$

Where:

$\ln NPL_{i,t}$  and  $\ln NPL_{i,t-1}$  = the natural log of the ratio of NPLs to total loans for bank  $i$  in year  $t$  and  $t-1$ ,

$\Delta GDP_t$  and  $\Delta GDP_{t-1}$  = the annual growth in real GDP at time  $t$  and  $t-1$ , respectively,

$\ln RIR_t$  and  $\ln RIR_{t-1}$  = the natural log of the real interest rates (measured as the difference between the weighted average lending rate and the annual inflation rate) at time  $t$  and  $t-1$ ,

$\ln REER_t$  and  $\ln REER_{t-1}$  = the natural log of the real effective exchange rate at time  $t$  and  $t-1$ ,

$\ln INF_t$  and  $\ln INF_{t-1}$  = the natural log of the annual inflation rate at time  $t$  and  $t-1$ ,

$\text{SIZE}_{i,t}$  = the ratio of the relative market share of each bank's assets that capture the size of the institution at time  $t$ ;

$\ln L_{Ai,t}$  = the natural log of the loans to total asset ratio for bank  $i$  in year  $t$ ;

$\Delta LOANS_{i,t}$ ,  $\Delta LOANS_{i,t-1}$  and  $\Delta LOANS_{i,t-2}$  = the growth in loans for bank  $i$  in year  $t$ ,  $t-1$ , and  $t-2$  respectively; and

$\varepsilon_{i,t}$  = the white noise error term.

In the model, the coefficient  $\beta_0 i$  captures the idiosyncratic behavior of commercial banks. The fixed effect coefficient allows for detecting those factors affecting NPLs that do not change over time. However, in the geographical location of modeling, we have to modify the model using the Specifications of macroeconomic variables and Bank Specific variables. In order to find the determinants of non-performing loans (NPLs) in the Nigeria banking Industry, we specify the following compact model equation:

$$NPLs = f(GDP, INFR, TLADV, TA, BLR) \dots \quad (1)$$

The general regression equation is of the form:

$$\begin{aligned} y = & \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots \beta_n x_n \\ & + \mu \dots \quad (2) \end{aligned}$$

Where:

$y$  = Dependent Variable (NPLs)

$x$  = Independent Variables (the various explanatory and control variables)

$\beta_0$  = Constant

$\beta_n x_n$  = are coefficients

$\mu$  = Stochastic disturbance

For equation 2 to be amiable for estimation, we transform to the mathematical model of the following:

$$NPLs = \beta_0 + \beta_1 GDP + \beta_2 INFR + \beta_3 TLADV + \beta_4 TA + \beta_5 BLR + \mu \dots \quad (3)$$

Where:

$\beta_0$ ,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$  are constants showing the value of NPLs or their coefficient when the explanatory variables are zero.

GDP = Gross Domestic Products

INFR = Inflation rate

TLADV = Total Loans and Advances

TA = Total Assets

BLR = Bank Lending rate

These are the slope coefficient indicating the amount of NPLs that will change when the explanatory variables increase by one unit.

$\mu$  = Error term.

Apriori expectations of the parameters are as follows:

- The coefficient of gross domestic product is expected to be negative (-) since an increase in GDP increases borrowers' ability to repay their loans.
- The coefficient of inflation is expected to be either positive or negative. (+/-)
- Total Loans and Advances are expected to have a positive sign (+) because an increase in loans portfolio increases the risk of non-performing loans.
- Total Assets are expected to be negative (-). An increase in the non-performing loans portfolio erodes the total asset base of the banks as the banks write off the loan losses from profit and the balance sheet size deteriorates.
- A Bank Lending rate is expected to have a positive value since the lending rate is the cost of borrowing funds for investment purposes; it follows that a high lending rate has the potential to discourage investors from borrowing and consequently reduce credit borrowed and reduce the ability to repay.

However, modifying and re-writing Pasha and Khemraj's (2009) model, the following equations were used to represent the hypothesis of this research:

### 3.3.1.1. Hypothesis One

Gross Domestic Product (GDP) does not have a significant impact on Non-Performing Loans (NPLs) in Nigerian Banking Industry.

Refer to the study model:

$$NPLs = \beta_0 + \beta_1 GDP + \beta_2 TLADV + \beta_3 BLR + \mu$$

Where:

NPLs = Non-Performing Loans

GDP = Gross Domestic Product

TLADV = Total Loans and Advances

BLR = Bank Lending rate

$\beta_0$  = Constant of the regression function

$\beta_1 - \beta_3$  = Coefficients of the independent variables

$\mu$  = Error term

### 3.3.1.2. Hypothesis Two

Inflation rate (INFR) does not have a positive and significant impact on Non-Performing Loans (NPLs) in the Nigerian Banking Industry.

Refer to the study model:

$$NPLs = \beta_0 + \beta_1 INFR + \beta_2 TLADV + \beta_3 TA + \mu$$

Where:

NPLs = Non-Performing Loans

INFR = Inflation rate

TLADV = Total Loans and Advances

TA = Total Assets

$\beta_0$  = Constant of the regression function

$\beta_1 - \beta_3$  = Coefficients of the independent variables

$\mu$  = Error term

### 3.3.1.3. Hypothesis Three

Total Loans and Advances (TLADV) of Banks do not have a positive and significant impact on Non-Performing Loans (NPLs) in Nigerian Banking Industry.

Refer to the study model:

$$NPLs = \beta_0 + \beta_1 TLADV + \beta_2 GDP + \beta_3 INFR + \mu$$

Where:

NPLs = Non-Performing Loans

TLADV = Total Loans and Advances

GDP = Gross Domestic Product

INFR = Inflation rate

$\beta_0$  = Constant of the regression function

$\beta_1 - \beta_3$  = Coefficients of the independent variables

$\mu$  = Error term

### 3.3.1.4. Hypothesis Four

Total Assets (TAs) of Banks do not have a positive and significant impact on Non-Performing Loans (NPLs) in Nigerian Banking Industry.

Refer to the study model:

$$NPLs = \beta_0 + \beta_1 TA + \beta_2 TLADV + \beta_3 GDP + \mu$$

Where:

NPLs = Non-Performing Loans

TA = Total Assets

TLADV = Total Loans and Advances

GDP = Gross Domestic Product

$\beta_0$  = Constant of the regression function

$\beta_1 - \beta_3$  = Coefficients of the independent variables

$\mu$  = Error term

### 3.3.1.5. Hypothesis Five

Banks' Lending Rates (BLRs) do not have a positive and significant impact on Non-Performing Loans (NPLs) in Nigerian Banking Industry.

Refer to the study model:

$$NPLs = \beta_0 + \beta_1 BLR + \beta_3 TLADV + \beta_4 TA + \mu$$

Where:

NPLs = Non-Performing Loans

BLR = Bank Lending rate

TLADV = Total Loans and Advances

TA = Total Assets

$\beta_0$  = Constant of the regression function

$\beta_1 - \beta_3$  = Coefficients of the independent variables

$\mu$  = Error term

### 3.4. Description of Model Variables

Research variables are critical factors in an investigation. A variable is anything that is changeable or alterable with the characteristic that takes on different values under different conditions. The variables to be used in modeling for this study are banks' Non-Performing Loans (NPLs), Gross Domestic Product (GDP), and Inflation rates (INFR); Total Loans and Advances (TLADV), Total Assets of the banks (TA), and Bank Lending rates (BLR).

#### 3.4.1. Dependent Variables

Dependent Variables, sometimes called the criterion variable describes the variables to be explained in a multiple regression model (and a variety of other models). The dependent variable is also called the explained variable, the response variable, the predicted variable, or the regressand (Woodridge, 2009:22). A dependent is what you measure in the experiment and what is affected during the experiment. The dependent variable responds to the independent variable. It is called dependent because it "depends" on the independent variable. In this study, NPL is the dependent variable.

The amended prudential guideline explained "Performing Loan" to mean credit facilities (which include loans, advances, overdrafts, commercial papers, bankers acceptances, bills discounted, leases, guarantees, and other loss contingencies connected with a bank's credit risks) with payments of both principal and interest being up-to-date in accordance with the agreed terms (CBN, 2010).

#### 3.4.2. Independent Variable

In regression analysis, it is a variable that is used to explain variation in the dependent variable. It is the variable you have control over, what you can choose and manipulate. It is usually what you think will affect the dependent variable. It is also referred to as the explanatory variable, the control variable, the predictor variable, or the regressor. In this study, the independent variables include – GDP, INFR, TLADV, TA, and BLR.

#### 3.4.3. Macroeconomic Factors

These are systemic factors that are external to the banks and, therefore, not within the direct control of the banks. In this study, these were identified as the Gross Domestic Product (GDP) and Annual Inflation Rate (INFR).

##### 3.4.3.1. Gross Domestic Product (GDP)

Gross domestic product (GDP) is defined as the market value of goods and services produced in a country in a fiscal year. In other words, it measures the total market values of all final goods and services produced in the economy within the period, usually one year. There is significant evidence of a relationship between the growth in GDP and NPLs (Salas & Saurina, 2002; Rajan & Dhal, 2003; Fofack, 2005; and Jimenez and Saurina, 2005). The justification provided here is that strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of borrowers, which in turn contributes to lower non-performing loans. This is in line with the works of Jimenez and Saurina (2005).

##### 3.4.3.2. Annual Inflation (INFR) Rate

Inflation (INFR), which is the percentage rate of increase in the general price level of goods and services, is another factor that could affect total bank loans and advances. Inflation is a change in the price of consumer goods and services purchased by households. An increase in the consumer price index (CPI) compels monetary regulators to use contractionary measures by increasing the interest rates to control inflation which later increases the cost of borrowing

and ultimately causes Non-Performing Loans to come forth. Its inclusion is informed by the fact that inflationary pressures contribute to the high level of impaired loans in an economy with a flexible exchange rate regime like Nigeria (Fofack, 2005). Inflation is another factor that could affect total bank loans and advances as it has a positive correlation with Non-Performing Loans. Further claims maintained that inflation is responsible for the rapid erosion of commercial banks' equity and, consequently, higher credit risk in the banking sector. It can also have a negative effect on financial market development because it reduces the income of investors, thus, their financial capability to pay back their loans.

#### **3.4.4. Bank-Specific Factors**

This refers to the unsystematic factors or those internal factors that are controllable by the banks. For the purpose of this research, amongst the numerous internal factors that data on them are difficult to access, we shall use Total Loans and Advances (TLADV), Total Assets (TAs), and Bank Lending Rate (BLR).

##### **3.4.4.1. Total Loans and Advances (TLADV)**

This is the total loans, advances and leases committed by the banks to both the private and public sector borrowings over a period. Credit growth can have the effect of growing Non-performing loans.

##### **3.4.4.2. Total Assets (TAs)**

Total Asset (TA) is the total net worth of the banks at the end of each financial year. For empirical calculations, Non-Performing Loans are computed against total assets because there is evidence in the literature that shows a strong relationship between Non-Performing Loans and the ratio of Loans to Asset (LA), which captures the risk appetite of the banks (Sinkey & Greenwalt, 1991). The supporting rationale is that banks that value profitability more than the cost of higher risk (represented by a high loan-to-asset ratio) are likely to incur higher levels of Non-Performing Loans during periods of economic downturn. Worsening Non-performing loans can deteriorate the value of the banks' assets. The proxy is used in line with the works of Sinkey and Greenwalt (1991).

##### **3.4.4.3. Bank Lending Rate (BLR)**

Bank Lending Rate or Interest Rate is the price a borrower pays for using the money they borrow from a lender/financial institution or the fee paid on borrowed assets (Crowley, 2007). Interest can be thought of as 'rent of money.' It reflects market information regarding expected changes in the purchasing power of money or future inflation (Ngugi, 2001). The difference between the gross costs of borrowing and the net return on lending defines the intermediary costs, which include: information costs, transaction costs, administration and default costs and operational costs (Rhyne, 2002). Interest rate is positively associated with Non-Performing Loans. Interest rate, being the cost of borrowing, may contribute negatively to the development of the financial market since a higher interest rate discourages investment and impairs the borrower's ability to repay their loans, thus, increasing the portfolio of Non-Performing Loans. This measure is adopted in line with the works of Ngugi (2001).

#### **3.4.5. Dependent Variable - Non-Performing Loans (NPLs)**

Non-Performing Loans are the dependent variable. Non-Performing Loans (NPLs) generally refer to loans that, for a relatively long period of time, do not generate income; that is, the principal and/or interest on these loans has been lying unpaid for at least 90 days (Caprio & Klingebiel, 1999). High Non-Performing Loans deteriorate the assets of the banks. Non-Performing Loans (NPLs) could also occur when the amortization schedules are not realized as at when due, resulting in over-bloated loan interest due for payments. The amended prudential guideline also explained 'Non-Performing Loan' to mean credit facility in which the following conditions exist:

- Interest or principal is due and unpaid for 90 days or more,
- Interest payments equal to 90 days of interest or more have been capitalized, rescheduled or rolled over into a new loan. (CBN, Prudential Guideline, June 2010).

#### ***3.5. Techniques for Analysis***

Suitable statistical tools will be used to analyze data collected and presented in the course of this research. They will also be presented in tabular and graphic forms and analyzed using statistical ratios. Ordinary Least Square and Multiple regression methods will be adopted. The EViews Statistical Package will be used to analyze and validate the hypothesis where necessary.

##### **3.5.1. Ordinary Least Square Regression Analysis (OLS)**

This research shall make use of the ordinary least square (OLS) regression techniques. The OLS method of modeling is best suited for testing specific hypotheses about the nature of economic relationships and it has been used in a wide range of economic relationships with satisfactory results. The method employs a sound statistical technique appropriate for empirical problems, and it has become so standard that its estimates are presented as a point of reference even when result from other estimation technique are used (Koutsoyanis, 1977). More so, the reliability of this method lies in its desirability properties which are efficiency, consistency and unbiasedness (Gujarati, 2004). One good advantage of this model is that it is very simple to formulate and its evaluation procedure is simple to handle.

### **3.5.2. Criteria of Results Evaluation**

We shall use three basic criteria to evaluate the results obtained from the model: Economic (a priori expectations), Statistical and Econometric criteria. The economic criteria will inform us if the signs of the coefficient variables conform to economic theory. The Statistical criteria shall focus on testing the significance of the variables using a t-test. F-statistic will be used to assess the joint significance of the overall regression to see whether the model is well specified. The econometric criterion would involve such tests as autocorrelation and multi-collinearity. The autocorrelation will help to check for the existence of serial correlation among the variables, while the multi-collinearity test will help to check if the variables are collinear.

#### **3.5.2.1. Economic Criteria**

The result will be evaluated to find out whether the estimated parameters meet the a priori expectation or conform to theory. Our main interest here is the signs and the sizes of the coefficients.

#### **3.5.2.2. Statistical Criterion**

This basically would be used to confirm the statistical significant of the results. We shall rely on the student t-test and the f-test for this test. While the t-test shows whether the individual explanatory variables are statistically significant or not, the f-test will show the overall goodness of the model.

#### **3.5.2.3. Econometric Criteria**

This involves conducting several econometrics tests to evaluate the true position of the model and/or the reliability of the statistical position. They are secondary tests carried out to further attest to the validity, reliability or otherwise of the statistical tests. The R<sup>2</sup> shall be used to find out whether the explanatory variables adequately explain the behavior of the dependent variable. Other econometric tests that will be conducted include autocorrelation, multi-collinearity, Unit Root test, Cointegration test and Granger Causality test. They are discussed briefly below:

##### **3.5.2.3.1. Autocorrelation Test**

This test will be performed to see whether the errors corresponding to different observations are uncorrelated. This ensures that assumption four of the Ordinary Least Square (Homoscedasticity – non-constant variance of the error term) is not violated. The conventional Durbin-Watson statistics shall be used for this test.

##### **3.5.2.3.2. Multi-Collinearity Test**

The presence of multi-collinearity makes it difficult to disentangle the individual influences of the explanatory variables. To detect the presence of this malaise, we shall adopt both the correlation matrix where the existence of multi-collinearity is captured by the pair-wise or zero ordered correlation coefficient between two regressors that exceeds 0.8 as suggested by Farrar and Glauber (1967), and Gujarati (2004). We shall equally employ the examination of the partial R<sup>2</sup> prescribed by Wooldridge (2009) and Gujarati (2004). This is because it has been argued that the Farrar-Glauber approach is only effective where only two explanatory variables are employed. From Klein's rules of thumb, if any of the partial R<sup>2</sup> exceeds the overall R<sup>2</sup>, then there is serious multi-collinearity.

##### **3.5.2.3.3. Unit Root Test**

A unit root is a feature of processes that evolve through time that can cause problems in statistical inference involving time series models. A linear stochastic process has a unit root if 1 is a root of the process's characteristics equation. Such a process is non-stationary. If the other roots of the characteristic equation lie inside the unit circle – that is, have a modulus (absolute value) less than one – then the first difference of the process will be stationary. In statistics, a unit root test tests whether a time series variable is non-stationary using an autoregressive model. A well-known test that is valid in large samples is the augmented Dickey-Fuller (ADF) test.

##### **3.5.2.3.4. Cointegration Test**

In the time series process, if two or more series are individually integrated, but some linear combination of them has a lower order of integration, then the series is said to be cointegrated. Johansen cointegration test is used in this study because Johansen test for cointegration allows for more than one cointegration relationship, unlike the Engle-Granger method. However, this test is subject to asymptotic properties, i.e., large samples.

##### **3.5.2.3.5. Granger Causality Test**

The Granger-Causality test is a statistical hypothesis test for determining whether one-time series is useful in forecasting another. For example, a time series X is said to Granger-Cause Y if it can be shown that those X values provide statistically significant information about future values of Y. Granger defined the causality relationship based on two principles:

- The case happens prior to its effect and
- The case has unique information about the future values of its effect

#### 4. Presentation of Data and Analysis

##### 4.1. Presentation and Analysis of Data

The objective of this chapter is to present, analyze and interpret data based on the objectives of the study. We begin with a look at the descriptive statistics of our data. However, the quantum values of the model are presented in appendix one (1) of this study.

	GDP (N'B)	TLADV	INFR	TA	BLR	NPL (N'B)
Mean	4563.612802	5989.768622	16.6611538	13650.25202	23.62399359	719.5704718
Median	2866.246877	2524.2979	13.04	7554.98	22.62	350.82
Maximum	14421.04921	17187.76571	72.8	51654.05845	30.72320966	2922.8
Minimum	176.2812817	94.1839	3.29	410.65	18.36	63.3
Std. Dev.	4391.140574	5985.438598	15.1958948	15165.53476	3.872850706	813.2805668
Skewness	0.814547635	0.615970435	2.92989494	1.096770997	0.655207579	1.641256132
Kurtosis	-0.544791548	-1.11123533	8.69807891	0.193271376	-0.651681612	1.697976878
Jarque-Bera	16.48779006	19.95492876	72.3723442	13.74679805	16.30629702	11.43097173
Probability	0.054596	0.214174	0.000099	0.064475	0.000029	0.00000000
Sum	118653.9329	155733.9842	433.19	354906.5525	614.2238335	15830.55038
Sum Sq. Dev.	482052888.6	895636880.3	5772.88047	5749836117	374.9743148	13889930.89
Observations	26	26	26	26	26	26

Source: Author's own Computations (2020).

Table 1: Result of the Descriptive Statistics of the Data (NPL Is the Dependent Variable)

The result shown in table 1 is based on the data in Appendix 1.2. The table shows the individual characteristics and the summary statistics of the data used for the study between 1994 and 2019 (26 observations or samples). Besides the mean, median and standard deviation, which give us the basic statistics, we also have the skewness and kurtosis, which shows us that each of the variables is positively skewed, while the Jarque-Bera statistic indicates that the data are mostly normally distributed. Judging from the probability values (p-values), we conclude that the estimates are statistically significant at the five percent (5%) level as in the case of Gross domestic product (GDP), Inflation rates (INFR), Bank lending rate (BLR) and Non-performing loan (NPL) whose estimated p-values are less than 0.05; whereas that of Total assets (TA) is significant from the 10% while Total loans and advances data is not significant at conventional levels. Also, GDP, TLADV and Total Assets (TAs) returned very low sum squared deviations, which points to the quality of the data.

A line graph of the data has also been provided showing at a glance the relationship between each independent variable and non-performing loan, which is the dependent variables.

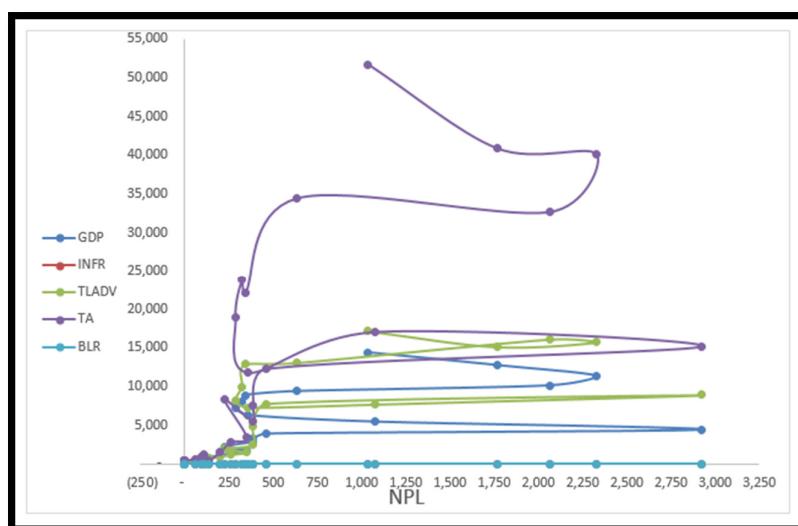
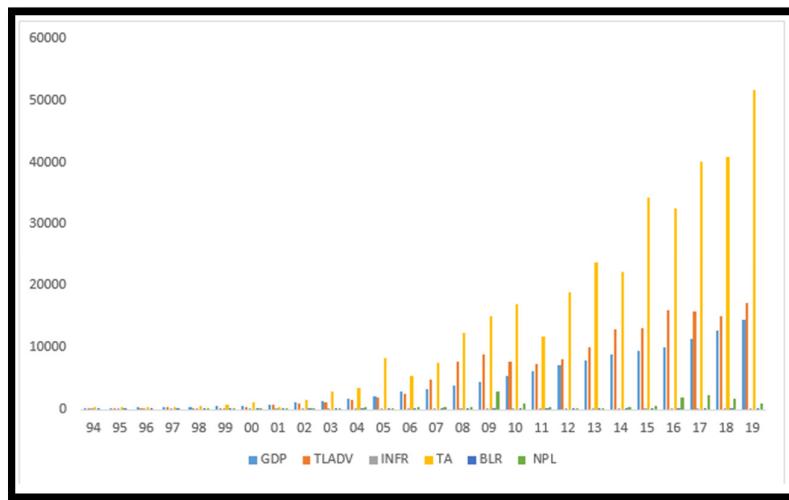


Figure 1: Line Graph of GDP, TLADV, INFR, TA, and BLR  
Source: Author's Own Computation (2020)

Figure 1 shows the relationship between total assets (TA), Total loans and advances (TLADV), Inflation rates (INFR), Gross domestic product (GDP) and Bank lending rate (BLR), each with Non-performing loan on a scale of 1 cm to 250 units on the horizontal (X) axis and 2 cm to 5000 units on the vertical (Y) axis based on the original data in Appendix 1.3. We notice from the graph that except in the case of INFR and BLR, movements in TA, TLADV and GDP has been erratic with GDP, Total loan and advances and Total assets appearing to grow alongside growth in Non-performing loan. Finally, a bar chart has also been provided, which gives us an insight into the movements in the variables over the years.



*Figure 2: Bar Chart of NPL, GDP, TLADV, INFR, TA, and BLR*

*Source: Author's Own Computation (2020).*

Figure 2 is yet another way to present the relationship between the determinants of non-performing loans and the non-performing loans themselves. As we saw in figure 1, the Total Assets (TAs) of the banks have increased rapidly over the years and so have the Total Loans and Advances (TLADV) and GDP. All three variables are noticed to have outgrown the non-performing loans between 1994 and 2019. This points to the possibility that rising TLADV or TAs might increase the likelihood of a few more loans becoming non-performing. Armed with the information from the overall descriptive analysis presented so far, we discuss the study objectives in the following subsections in relation to the prevalent economic situation in Nigeria. The essence is to ascertain the impact of each determinant on the non-performing loan of the banks within the period covered by the study.

#### 4.1.1. Objective One: The impact of Gross Domestic Product (GDP) on Non-Performing Loans (NPLs) in the Nigerian Banking Industry

The two variables have been singled out and shown in the table below. Their descriptive statistics have been included to explain how they have moved over the years. Analysis of the rest of the objectives follows a similar procedure.

YEAR	NPL (N'N)	GDP (N'N)
1994	0.000000	176.28
1995	0.000000	289.52
1996	0.000000	377.91
1997	0.000000	411.16
1998	63.3000	458.90
1999	94.7900	530.74
2000	111.5700	689.75
2001	135.7400	813.41
2002	199.6200	1,133.23
2003	260.1900	1,330.16
2004	350.8200	1,732.13
2005	225.0800	2,227.00
2006	387.9900	2,866.25
2007	388.1300	3,299.54
2008	463.4900	3,915.79
2009	2,922.8000	4,428.56
2010	1,077.6000	5,461.23
2011	360.0700	6,298.04
2012	286.0900	7,171.39
2013	324.1000	8,009.26
2014	343.1900	8,904.36
2015	635.9896	9,414.50
2016	2,066.2250	10,148.95
2017	2,331.1820	11,371.16
2018	1,766.1615	12,773.68
2019	1,036.4223	14,421.05
Mean	608.8673	4563.6128
Median	324.1000	2866.2469
Maximum	2,922.8000	14421.0492
Minimum	0.000000	176.2813
Std. Dev.	791.01005	4391.1406
Skewness	1.803155	0.8145
Kurtosis	2.421016	-0.5448
Jarque-Bera	14.452418	16.4878
Probability	-	0.0546
Sum	15,830.5504	118,653.93
Sum Sq. Dev.	15,642,422.67	482,052,889
Observations	26	26

*Table 2: Non-Performing Loans (NPLs) and Gross Domestic Product (GDP)*

*Sources: CBN Statistical Bulletin, National Bureau of Statistics and Author's Computation (2020)*

As shown in table 2 above, the mean value of aggregate Bank Non-Performing Loans (NPLs) for the period was N608.87 billion, while the median was N324.10 billion. The highest amount of banks' Non-Performing Loans (NPLs) was in

2009, when the aggregate Bank Non-Performing Loan was N2,922.80 billion, while the year with the minimum amount of Non-Performing Loans was 1998, when the Non-Performing Loans was N63.30 billion. The standard deviation was N791.01 billion. The Skewness of 1.80 reveals a leptokurtic or positive Skewness. It further reveals that the degree of symmetry or departure from the mean of the distribution is positive and there was a consistent increase in Non-Performing Loans up to 2010, when it declined steadily until 2014 and started moving up again from 2015 to 2017 and now observing a gradual reduction from 2018.

This is consistent with the normal financial series from research. The Kurtosis, which is  $2.40 > 1.8$ , is slightly Peaked, which indicates that the degree of Peakness within the period of this study was normally distributed as most of the values hovered around the mean. Jarque-Bera Statistics, which is an indication of the normality of distributions, was 14.45, while Probability is 0.00.

Table 2 presents the Gross Domestic Product (GDP) of Nigeria at current basic prices. The mean value was N4,563.61 billion, while the median was N2,866.25 billion. The year with the maximum amount of GDP was 2019 when GDP was N14,421.05 billion, while the year with the minimum amount of GDP was 1994 when GDP was N176.28 billion. The Standard Deviation of GDP was N4,391.14. The Skewness of 0.81 reveals a flat peaked skewness. The Kurtosis, which is  $-0.54 < 3$ , is approximately normal, while Jarque-Bera Statistics is 16.49 and Probability is 0.05.

#### 4.1.2. Objective Two: The Effect of Inflation (INFR) On Non-Performing Loans (NPLs) In the Nigerian Banking Industry

The information in table 2 gives us insight into the relationship between inflation and non-performing loans within the last two decades.

YEAR	NPL (N'N)	INFR
1994	0.000000	57.00
1995	0.000000	72.80
1996	0.000000	29.30
1997	0.000000	17.57
1998	63.3000	8.11
1999	94.7900	9.11
2000	111.5700	3.29
2001	135.7400	15.62
2002	199.6200	16.18
2003	260.1900	11.20
2004	350.8200	17.62
2005	225.0800	14.73
2006	387.9900	13.54
2007	388.1300	6.34
2008	463.4900	7.86
2009	2,922.8000	13.04
2010	1,077.6000	13.26
2011	360.0700	12.11
2012	286.0900	11.48
2013	324.1000	10.25
2014	343.1900	8.08
2015	635.9896	9.01
2016	2,066.2250	15.68
2017	2,331.1820	16.52
2018	1,766.1615	12.09
2019	1,036.4223	11.40
Mean	608.8673	16.66115
Median	324.1000	13.04
Maximum	2,922.8000	72.8
Minimum	0.000000	3.29
Std. Dev.	791.01005	15.19589
Skewness	1.803155	2.929895
Kurtosis	2.421016	8.698079
Jarque-Bera	14.452418	72.37234
Probability	-	0.000099
Sum	15,830.5504	433.19
Sum Sq. Dev.	15,642,422.67	5772.88
Observations	26	26

Table 3: Non-Performing Loans and Inflation rate (INFR)

Source: CBN Statistical Bulletin, National Bureau of Statistics and Author's Computation (2020)

As shown in table 3 above, the mean value of aggregate Bank Non-Performing Loans (NPLs) for the period was N608.87 billion, while the median was N324.10 billion. The highest amount of banks' Non-Performing Loans (NPLs) was in 2009, when the aggregate Bank Non-Performing Loan was N2,922.80 billion, while the year with the minimum amount of Non-Performing Loans was 1998 when the Non-Performing Loans was N63.30 billion. The standard deviation was N791.01 billion. The Skewness of 1.80 reveals a leptokurtic or positive Skewness. It further reveals that the degree of symmetry or departure from the mean of the distribution is positive and there was a consistent increase in Non-Performing Loans up to 2010, when it declined steadily until 2014 and started moving up again from 2015 to 2017 and now observing a gradual reduction from 2018.

This is consistent with the normal financial series from research. The Kurtosis, which is  $2.40 > 1.8$ , is slightly Peaked, which indicates that the degree of Peakness within the period of this study was normally distributed as most of the values hovered around the mean. Jarque-Bera Statistics, which indicates the normality of distributions, is 14.45, while Probability is 0.00.

Again, table 3 presents Inflation Rate (INFR). The mean value is 16.66%, while the median is 13.04%. The year with the highest inflation rate was 1995. The standard deviation of the inflation rate is 15.19%, while skewness of  $2.92 < 3$  depicts a flat peaked skewness and negative. The Kurtosis shows a leptokurtic value of  $8.69 > 3$  and is positive. The Jarque-Bera statistics is 72.37 and Probability is 0.00.

#### 4.1.3. Objective Three: The Impact of Total Loans and Advances (TLADV) of Banks on Non-Performing Loans (NPLs) In the Nigerian Banking Industry

The information in table 3 gives insight into the nature of the movements in Total loans and advances and Non-performing loans within about the last two decades. The descriptive statistics have been included.

YEAR	NPL (N'B)	TLADV (N'B)
1994	0.000000	94.18
1995	0.000000	144.57
1996	0.000000	169.44
1997	0.000000	385.55
1998	63.3000	272.90
1999	94.7900	322.76
2000	111.5700	508.30
2001	135.7400	796.16
2002	199.6200	954.63
2003	260.1900	1,210.03
2004	350.8200	1,519.24
2005	225.0800	1,976.71
2006	387.9900	2,524.30
2007	388.1300	4,813.49
2008	463.4900	7,799.40
2009	2,922.8000	8,912.14
2010	1,077.6000	7,706.43
2011	360.0700	7,312.73
2012	286.0900	8,150.03
2013	324.1000	10,005.59
2014	343.1900	12,889.42
2015	635.9896	13,086.20
2016	2,066.2250	16,117.20
2017	2,331.1820	15,740.59
2018	1,766.1615	15,134.20
2019	1,036.4223	17,187.77
Mean	608.8673	5,989.77
Median	324.1000	2,524.30
Maximum	2,922.8000	17,187.77
Minimum	0.000000	94.18
Std. Dev.	791.01005	5,985.44
Skewness	1.803155	0.61597
Kurtosis	2.421016	(1.11124)
Jarque-Bera	14.452418	19.95493
Probability	-	0.21417
Sum	15,830.5504	155,733.98
Sum Sq. Dev.	15,642,422.67	895,636,880.27
Observations	26	26

*Table 4: Non-Performing Loans (NPLs) and Total Loans and Advances (TLADV)*  
*Sources: CBN Statistical Bulletin, National Bureau of Statistics and Author's Computation (2020)*

As shown in table 4 above, the mean value of aggregate Bank Non-Performing Loans (NPLs) for the period was N608.87 billion, while the median was N324.10 billion. The highest amount of banks' Non-Performing Loans (NPLs) was in 2009, when the aggregate Bank Non-Performing Loan was N2,922.80 billion, while the year with the minimum amount of Non-Performing Loans was 1998 when the Non-Performing Loans was N63.30 billion. The standard deviation was N791.01 billion. The Skewness of 1.80 reveals a leptokurtic or positive Skewness. It further reveals that the degree of symmetry or departure from the mean of the distribution is positive and there was a consistent increase in Non-Performing Loans up to 2010, when it declined steadily until 2014 and started moving up again from 2015 to 2017 and now observing a gradual reduction from 2018. This is consistent with the normal financial series from research. The Kurtosis, which is  $2.40 > 1.8$ , is slightly Peaked, which indicates that the degree of Peakness within the period of this study was normally distributed as most of the values hovered around the mean. Jarque-Bera Statistics, which is an indication of the normality of distributions, is 14.45, while Probability is 0.00.

As depicted in table 4, the mean value of the aggregate quantum of bank loans and advances is N5, 989.20 billion. The median is N2, 524.30 billion. The maximum Loans and Advances granted by the banks was N17, 187.77 billion occurred in 2019, while the lowest of N94.18 billion was in 1994. The standard deviation of Total Loans and Advances was N5, 985.44. The skewness 0.62<3 was recorded, revealing a platykurtosis or flat peaked shape and positive. The positive skewness revealed that the degree of departure from the mean of the distribution was positively increasing throughout the period of this study. The kurtosis revealed a -1.11<3 relationship which is less than normal distribution and negative. The fitness of the test, as measured by the Jarque-Bera test, revealed a 19.95>3, revealing a leptokurtic or highly peaked and positive relationship. The Probability revealed a non-significant 0.21 value.

#### 4.1.4. Objective Four: The Effect of Total Assets (TAs) of Banks on Non-Performing Loans (NPLs) in the Nigerian Banking Industry

The information in table 4 gives insight into the nature of the movements in Non-performing loans and Banks' Total Assets within about the last twenty-five years. The descriptive statistics have been included.

YEAR	NPL (N'N)	TA (N'N)
1994	0.000000	469.32
1995	0.000000	410.65
1996	0.000000	443.25
1997	0.000000	470.64
1998	63.3000	647.72
1999	94.7900	890.36
2000	111.5700	1,201.47
2001	135.7400	488.44
2002	199.6200	1,546.35
2003	260.1900	2,868.92
2004	350.8200	3,416.23
2005	225.0800	8,286.69
2006	387.9900	5,514.58
2007	388.1300	7,554.98
2008	463.4900	12,275.38
2009	2,922.8000	15,161.00
2010	1,077.6000	17,033.89
2011	360.0700	11,787.21
2012	286.0900	18,929.34
2013	324.1000	23,783.76
2014	343.1900	22,165.23
2015	635.9896	34,388.31
2016	2,066.2250	32,622.31
2017	2,331.1820	40,061.11
2018	1,766.1615	40,835.35
2019	1,036.4223	51,654.06
Mean	608.8673	13,650.25
Median	324.1000	7,554.98
Maximum	2,922.8000	51,654.06
Minimum	0.000000	410.65
Std. Dev.	791.01005	15,165.53
Skewness	1.803155	1.09677
Kurtosis	2.421016	0.19327
Jarque-Bera	14.452418	13.74680
Probability	-	0.06448
Sum	15,830.5504	354,906.55
Sum Sq. Dev.	15,642,422.67	5,749,836,117.3
Observations	26	26

Table 5: Non-Performing Loans and Total Assets (TA)  
Sources: CBN Statistical Bulletin, National Bureau of Statistics and Author's (2020)

As shown in table 5 above, the mean value of aggregate Bank Non-Performing Loans (NPLs) for the period was N608.87 billion, while the median was N324.10 billion. The highest amount of banks' Non-Performing Loans (NPLs) was in 2009, when the aggregate Bank Non-Performing Loan was N2,922.80 billion, while the year with the minimum amount of Non-Performing Loans was in 1998, when the Non-Performing Loans was N63.30 billion. The standard deviation was N791.01 billion. The Skewness of 1.80 reveals a leptokurtic or positive Skewness. It further reveals that the degree of symmetry or departure from the mean of the distribution is positive and there was a consistent increase in Non-Performing Loans up to 2010, when it declined steadily until 2014 and started moving up again from 2015 to 2017 and now observing a gradual reduction from 2018. This is consistent with the normal financial series from research. The Kurtosis, which is  $2.40 > 1.8$ , is slightly Peaked, which indicates that the degree of Peakness within the period of this study was normally distributed as most of the values hovered around the mean. Jarque-Bera Statistics, which is an indication of the normality of distributions, is 14.45, while Probability is 0.00.

Table 5 shows that the mean value of Total Assets was N13,650.25 billion, while the median value was N7,554.98 billion. The highest Total Assets acquired by the banks in Nigeria was in 2019, with a value of N51,654.06 billion, while the minimum value of N410.65 billion was in 1995. The standard deviation from the mean was N15,165.53 billion. The test statistics revealed a skewness of  $1.09 < 3$ . The skewness is negative as it is less than the normal distribution. Kurtosis measured  $0.19 < 3$ . The kurtosis revealed a negative platykurtosis and a positive relationship. The Jarque-Bera statistics revealed a value of 13.75 and a Probability value of 0.06.

#### 4.1.5. Objective Five: The Impact of Bank Lending Rate (BLR) on Non-Performing Loans (NPLs) in the Nigerian Banking Industry

The information in table 6 gives insight into the nature of the movements in Non-performing loans and Banks' lending rates within about the last two decades, including the descriptive statistics.

YEAR	NPL (N'B)	BLR %
1994	0.000000	21.00
1995	0.000000	20.79
1996	0.000000	20.86
1997	0.000000	23.32
1998	63.3000	21.34
1999	94.7900	27.19
2000	111.5700	21.55
2001	135.7400	21.34
2002	199.6200	30.19
2003	260.1900	22.88
2004	350.8200	20.82
2005	225.0800	19.49
2006	387.9900	18.70
2007	388.1300	18.36
2008	463.4900	18.70
2009	2,922.8000	22.62
2010	1,077.6000	22.51
2011	360.0700	22.42
2012	286.0900	23.79
2013	324.1000	24.69
2014	343.1900	25.74
2015	635.9896	26.71
2016	2,066.2250	27.29
2017	2,331.1820	30.68
2018	1,766.1615	30.52
2019	1,036.4223	30.72
Mean	608.8673	23.62
Median	324.1000	22.62
Maximum	2,922.8000	30.72
Minimum	0.000000	18.36
Std. Dev.	791.01005	3.87
Skewness	1.803155	0.65521
Kurtosis	2.421016	(0.65168)
Jarque-Bera	14.452418	16.30630
Probability	-	0.00003
Sum	15,830.5504	614.22
Sum Sq. Dev.	15,642,422.67	375.0
Observations	26	26

*Table 6: Non-Performing Loans Banks' lending rate**Sources: CBN Statistical Bulletin, National Bureau of Statistics and Author's Computation (2020)*

As shown in table 6 above, the mean value of aggregate Bank Non-Performing Loans (NPLs) for the period was N608.87 billion, while the median was N324.10 billion. The highest amount of banks' Non-Performing Loans (NPLs) was in 2009, when the aggregate Bank Non-Performing Loan was N2,922.80 billion, while the year with the minimum amount of Non-Performing Loans was 1998, when the Non-Performing Loans was N63.30 billion. The standard deviation was N791.01 billion. The Skewness of 1.80 reveals a leptokurtic or positive Skewness. It further reveals that the degree of symmetry or departure from the mean of the distribution is positive and there was a consistent increase in Non-Performing Loans up to 2010, when it declined steadily until 2014 and started moving up again from 2015 to 2017 and now observing a gradual reduction from 2018.

This is consistent with the normal financial series from research. The Kurtosis, which is 2.40>1.8, is slightly Peaked, which indicates that the degree of Peakness within the period of this study was normally distributed as most of the values hovered around the mean. Jarque-Bera Statistics, which is an indication of the normality of distributions, is 14.45, while Probability is 0.00.

Table 6 shows that the mean value of Bank Lending Rate for the period of study was 23.62%, while the median value was 22.62%. The highest Bank Lending Rate by the banks in Nigeria was 30.72%. The year happens to be 2019, while the lowest Bank Lending Rate was 18.36% in 2007. The standard deviation of Bank Lending Rate from the mean was 3.87%. The test statistics revealed a Skewness of 0.65<3. The Skewness is negative as it is less than the normal distribution. Kurtosis measured -0.65>3. The kurtosis revealed negative kurtosis, a low peak and a negative relationship. The Jarque-Bera statistics revealed a value of 16.31 and a Probability value of 0.00.

#### 4.2. Preliminary Tests

##### 4.2.1. Unit Root Test

First, the data were subjected to Unit Roots Test to determine whether there is the Unit Root Problem with which non-stationary data are usually infested. The purpose of the test is to apply the appropriate technique in estimating the relationship. The Augmented Dickey-Fuller (ADF) method was used to conduct the Unit Roots Test and significance was anchored on the 5% critical level. A summary of the result is shown in table 7.

Variable	ADF Statistic	1% Critical Level	5% Critical Level	10% Critical Level	Order of Integration	Level of Stationarity
NPL	0.53634	1.68385	2.02108	2.03224	1 (1)	First Difference
GDP	2.27006	1.67866	2.01290	2.02108	1 (0)	Level
INFR	-12.4472	1.67866	2.01290	2.01537	1 (0)	Level
TLADV	0.67474	1.67866	2.01290	2.01537	1 (1)	First Difference
TA	-3.76255	1.67866	2.01290	2.01537	1 (1)	First Difference
BLR	-1.16814	1.67866	2.01290	2.01537	1 (0)	Level

Table 7: Summary of Unit Roots Test Result

Source: Author's Compilation, (2020)

The last column of table 7 shows the order of integration of the series. The Non-Performing Loan (NPL), Total Loans and Advances (TLADV) and Total Asset (TA) series are integrated of order one, i.e., I(1), showing they have unit roots and became stationary only after first differencing. On the other hand, the Gross Domestic Product (GDP), Inflation Rate (INFR) and Bank Lending Rate (BLR) series are integrated of order zero, i.e., I(0), which means they are stationary at a level and therefore, have no unit roots problem which could be corrected by logging the affected variables or estimating using the stationary form of the model, unless the residual from the normal estimation based on the non-stationary data is stationary at level, in which case the error correction mechanism is properly (negatively) signed. The present study explores this last avenue to achieving reliable or robust estimates.

#### 4.2.2. Granger Causality Test

It is important to establish the direction of causality between the dependent variable (NPL) and the independent variables (GDP, INFR, TLADV, TA, BLR). The essence is to show whether the only change in the later variables drives changes in the former or the other way around or both. Consequently, the pair-wise Granger Causality Test was employed and the decision was based on the 0.05 level. The relevant result has been abstracted.

Null Hypotheses (H <sub>0</sub> ) Decision	Obs.	F-Statistic	Prob.
GDP does not Granger Cause NPL Accept H <sub>0</sub>	24	0.21671	0.8076
NPL does not Granger Cause GDP Reject H <sub>0</sub>		102.679	0.0000
INFR does not Granger Cause NPL Accept H <sub>0</sub>	24	0.63098	0.5456
NPL does not Granger Cause INFR Accept H <sub>0</sub>		0.00394	0.9961
TLADV does not Granger Cause NPL Reject H <sub>0</sub>	24	8.90019	0.0028
NPL does not Granger Cause TLADV Reject H <sub>0</sub>		5.9904	0.0122
TA does not Granger Cause NPL Accept H <sub>0</sub>	24	1.09469	0.3599
NPL does not Granger Cause TA Accept H <sub>0</sub>		1.65366	0.2244
BLR does not Granger Cause NPL Accept H <sub>0</sub>	24	1.34492	0.2902
NPL does not Granger Cause BLR Accept H <sub>0</sub>		0.01591	0.9842

Source: Author's compilation (2020)

Table 8: Summarized Pairwise Granger Causality Test Result

The result in table 8 can be understood by taking a pair at a time. P-values greater than 0.05 or otherwise mean accepting the null hypothesis or otherwise rejecting it based on the 5% level of significance. First, between GDP and NPL, we notice there is one-way causation or unidirectional flow from NPL to GDP. Acceptance of the first null hypothesis in the table means changes in GDP does not necessarily drive changes in non-performing loan (NPL), whereas the rejection of the second null hypothesis is an indication that changes in NPL drives changes in the GDP – just as the OLS result of the estimated relationship shows that a negative relationship exists between GDP and NPL such that sustained fall in GDP may be an indication of rising non-performing loans.

Next, the result between inflation rate (INFR) and non-performing loan (NPL) shows no significant relationship between the two: INFR does not Granger-cause NPL and NPL does not Granger-cause INFR. This means that within the last two decades, the two variables do not strongly drive each other. This corroborates the OLS result where the estimated parameter for inflation is statistically insignificant, showing that whatever perceived relationship exists between the variables is attributable to chance.

Between Total loans and advances (TLADV) and non-performing loans (NPLs), the result shows a two-way causation. Changes in TLADV drive changes in NPL and changes in NPL drive changes in TLADV. Hence, the 5th and 6th Null Hypotheses in table 8 are rejected. This means that within the last two decades, changes in NPL have significantly affected changes in TLADV and the estimated relationship indicates that both variables move in the same direction. Finally, the test result equally shows that banks' Total Assets do not Granger Cause their non-performing loan and the latter does not Granger cause the former as well. Similarly, Bank lending rates do not Granger cause non-performing loans and vice versa. This is especially the case considering that the lending rate is determined in conjunction with monetary authorities.

**Cointegration Test** Johansen cointegration test was applied to the I(1) series, that is, the variables integrated of order one (1) alongside the dependent variable, non-performing loan, that is, Total Loan and advances (TLADV) and Total Assets (TA). The Trace and Max-eigenvalue tests results indicate two (2) cointegrating equations, which means that a long-run relationship exists among the variables of the study. A summary of the result is shown in table 9.

Equation	Dependent Variable	Coefficient	D (TLADV)	D (TA)
1	D (NPL)	30.7491	0.1460	(0.0217)
	(Std. Error)	165.1500	0.0745	0.0294
	(t*)	0.1862	1.9589	(0.7382)
2	D (NPL)	(107.6041)	0.2519	(0.0113)
	(Std. Error)	176.3578	0.1249	0.0357
	(t*)	(0.6101)	2.0164	(0.3169)

Table 9: Summary of Cointegration Test Result Equation Dependent  
Source: Author's compilation (2020)

The estimated t-values (t\*) of the two cointegrating equations in table 9 are each greater than two (2), showing that the estimates are statistically different from zero and, as such, are significant. Having satisfied the preliminary tests, we estimated the general model of the study to obtain an overview of the relative impact of GDP, Inflation rate, Total loans and advances, Total assets and bank lending rates on the non-performing loans in the Nigerian banking industry. The error correction mechanism (ECM) was necessary to capture the short-run dynamics. A summary of the estimated relationship is shown below.

<b>NPL</b> = - 327.149 - 0.4347GDP - 0.3163INR + 0.2881TLADV + 0.0432TA + 25.8003BLR						
(SEE)	876.1889	0.1658	7.5522	0.0869	0.0410	39.0573
(t*)	-0.3734	-2.6215	-0.0419	3.3165	1.0541	0.6606
(Prob)	0.7128	0.0163	0.9670	0.0034	0.3044	0.5164
R Square		0.6376				
Adjusted R Square		0.5470				
F-Statistic		7.0367				
D-W Statistic		1.7440				
SEE = Standard Error Estimate						

Source: Author's own compilation (2020)

*Table 10: Presentation of the Ordinary Least Squares (OLS) Result*

The result presented in table 10 shows that there is a positive relationship between Total loans and advances, Total assets, Bank lending rate and Non-performing loans of the banking industry of Nigeria within the period under review. On the other hand, there is a negative relation between the countries' national income (GDP), Inflation rate and the level of non-performing loans in the industry. The signs of the estimated parameters are mostly acceptable and in line with theoretical expectations.

Next, we give attention to the numerical values behind the signs. The result shows that a unit increase in real GDP, on average, and every other factor remaining the same, brought about 0.4347 units to decrease in non-performing loans per annum between 1994 and 2019. By unit increase, it means that if GDP rises or falls by one billion nairas, the total level of non-performing loans would rise or fall also by about 0.4347 billion naira per annum.

Similarly, one percentage rise in the annual inflation rates, on average, and everything else remaining the same resulted in a decrease in the total value of non-performing loans by 0.3163 units per annum. Also, for a similar unit increase in the volume of total loans and advances, non-performing loans rise by 0.2881 billion nairas per annum. Changes in the total assets of the banks and changes in the volume of non-performing loans are observed to move in similar directions such that one unit increase in banks' total assets brought about 0.0432 units increase in their non-performing loans per annum within the study period and all other factors remaining the same. However, the same could not be said of the effect of changes in the Bank lending rate, which rises or falls with changes in the non-performing loan of the banks. This is because the result shows that a one percent increase in the bank lending rate brought about a 25.8003 billion naira increase in the volume of the banks' non-performing loans per annum. Every other factor held constant.

Going by the magnitude of the impact of the independent variables as shown by the estimated numerical values obtained, it can be seen that changes in bank lending rate (BLR) drive changes in non-performing loans (NPL) the most.

As noted earlier, the error correction mechanism (ECM) was necessary to tie the short-run differences to the long-run, making for a more reliable estimated relation. The ECM variable is zero, which means that the short-run variations ties in with the long-run or attain equilibrium. Furthermore, the results satisfy both statistical and econometrics properties. For instance, the coefficient of multiple determination (R-squared) value of 0.7225 shows that the independent variables explained about 72% of the total variation in the dependent variable. Also, the probability value of the F-statistic is 0.0006, which is less than 0.05, showing that the joint influence of the explanatory variables is statistically significant. Finally, the Durbin-Watson value of 2.25 (which is greater than 2.0) shows the absence of autocorrelation in the estimated relationship.

#### 4.3. Test of Hypotheses

In order to carry out this exercise, we follow the following processes:

- A restatement of the hypothesis into null and alternative forms,
- A statement of the decision rule,
- A presentation of analytical discussion/results, and
- Finally, the conclusion

##### 4.3.1. Hypothesis One

###### 4.3.1.1. Step One

Restatement of the Hypothesis in Null and Alternate forms:

- H0: Gross Domestic Product (GDP) does not have a significant impact on non-performing loans (NPLs) in the Nigerian Banking Industry

- HA: Gross Domestic Product has a significant impact on Non-performing loans in the Nigeria Banking Industry.

#### 4.3.1.2. Step Two: Decision Rule and Analysis

- Accept HA (and reject H0) if the coefficient estimate of GDP is negatively signed and statistically significant (i.e.,  $p < 0.5$  or  $tc \geq 2.0$ ).
- Accept H0 (and reject HA) if the coefficient estimate of GDP is not negatively signed and statistically insignificant (i.e.,  $p > 0.5$  or  $tc \leq 2.0$ ).

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20 Time: 00:42				
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	-655.6477	782.776595	-0.8375923	0.4112671
GDP	-0.316729	0.11932071	-2.6544351	0.0144824
TLADV	0.304793	0.08354237	3.6483694	0.0014162
BLR	37.43236	36.7665812	1.0181083	0.3196929
R-squared	0.6168684	Mean dependent var	608.86732	
Adjusted R-squared	0.5646232	S.D. dependent var	791.01005	
S.E. of Regression	521.93285	Akaike info criterion	402.26774	
Sum square resid	5993105.9	Schwarz criterion	404.95112	
Log likelihood	-197.58841	Hannan-Quinn criterion	391.91873	
F-statistic	11.807176	Durbin- Watson stat	1.5576959	
Prob(F-statistic)	0.0000813			

Table 11: Regression Result of Hypothesis One

Source: Researcher's Compilation (2020)

Table 11 presents the impact of Gross Domestic Product (GDP) on Non-performing loans in the Nigerian banking industry. As revealed from the table, the coefficient estimate of GDP is -0.317 showing that the variable had a negative impact on the value of non-performing loans (NPLs) in the economy, with Total loans and advances and Bank lending rates as control variables. The result indicates that an increase in the GDP by one unit reduces the NPLs by 0.3167 billion nairas, on average, per annum. The statistical properties of the result are satisfactory, as can be deduced from the R-squared value of 0.617 (62%), which shows that the GDP, TLADV and BLR explained about 62% of the total variations in the NPLs within the period under review. Also, the probability of the F-statistic (0.0001<0.05) shows that the joint impact of the explanatory variables, taken together, is statistically significant at the 5% level of significance. Similarly, the high Durbin-Watson value of 1.56, which is still quite below 2.0, indicates no serial correlation (autocorrelation) in the estimated regression model.

#### 4.3.1.3. Step Three: Conclusion

Since the coefficient estimate of the GDP variable is negatively signed (-0.316729) and statistically significant at the 5% level ( $p$ -value of  $0.0001 < 0.05$  or  $tc$  of  $-2.654 \geq 2$  in absolute terms), we accept HA and accordingly reject H0. We conclude that changes in gross domestic product have a significant impact on non-performing loans in the Nigerian banking industry.

#### 4.3.2. Hypothesis Two

##### 4.3.2.1. Step One: Restatement of the hypothesis in null and alternate forms

- H0: Inflation rates do not have a significant impact on non-performing loans in the Nigerian banking industry
- HA: Inflation rates have a significant impact on non-performing loans in the Nigerian banking sector.

##### 4.3.2.2. Step Two: Decision Rule and Analysis

- Accept HA (and reject H0) if the coefficient estimate of the inflation rate is positively signed and statistically significant (i.e.,  $p < 0.5$  or  $tc \geq 2.0$ ).
- Accept H0 (and reject HA) if the coefficient estimate of the inflation rate is not positively signed and statistically insignificant (i.e.,  $p > 0.5$  or  $tc \leq 2.0$ ).

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20 Time: 00:42				
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	-28.965535	247.714679	-0.1169310	0.9079756
INFR	2.720678	8.27508117	0.3287797	0.7454314
TLADV	0.151316	0.07772125	1.9469062	0.0644247
TA	-0.022992	0.03025495	-0.7599366	0.4553597
R-squared	0.50802421	Mean dependent var	608.86732	
Adjusted R-squared	0.44093660	S.D. dependent var	791.01005	
S.E. of Regression	591.442509	Akaike info criterion	408.76907	
Sum square resid	7695693.32	Schwarz criterion	411.45245	
Log likelihood	-200.839078	Hannan-Quinn criterion	398.42006	
F-statistic	7.572549	Durbin- Watson stat	1.4716902	
Prob(F-statistic)	0.0012			

Table 12: Regression Result of Hypothesis Two  
Source: Researcher's Compilation (2020)

Table 12 presents the impact of inflation rate (INFR) on Non-performing loans in the Nigerian banking industry. As revealed from the table, the coefficient estimate of INFR is 2.721 showing that the variable had a positive impact on the value of non-performing loans (NPLs) in the period under review, with Total loans and advances and Total assets of the banks as control variables. The result indicates that an increase in the inflation rate by one percent increases the NPLs by 2.721 percent, on average per annum. The statistical properties of the result are satisfactory as can be deduced from the R-squared value of 0.508 (51%) which shows that the INFR, TLADV and TA explained about 60% of the total variations in the NPLs within the period under review. Also the probability of the F-statistic (0.001<0.05) shows that the joint impact of the explanatory variables taken together, is statistically significant at the 5% level of significance. Similarly the high Durbin-Watson value of 1.47, which is lower than 2.0, is an indication of no serial correlation (autocorrelation) in the estimated regression model.

#### 4.3.2.3. Step Three: Conclusion

Since the coefficient estimate of the inflation rate variable is positively signed (2.720678) and statistically insignificant at the 5% level (p-value of 0.7454 > 0.05 or  $t_c$  of 0.3288< 2), we accept  $H_0$  and accordingly reject  $H_A$ . We conclude that the inflation rate did not have significant impact on non-performing loan in the Nigeria banking industry.

#### 4.3.3. Hypothesis Three

##### 4.3.3.1. Step one: Restatement of the hypothesis in null and alternate forms

- $H_{o3}$ : Total loans and advances does not have significant impact on non-performing loans in the Nigerian banking industry
- $H_{a3}$ : Total loans and advances has significant impact on non-performing loans in the Nigerian banking industry.

##### 4.3.3.2. Step Two: Decision Rule and Analysis

- Accept  $H_A$  (and reject  $H_0$ ) if coefficient estimate of Total loans and advances is positively signed and statistically significant (i.e.  $p < 0.5$  or  $t_c \geq 2.0$ ).
- Accept  $H_0$  (and reject  $H_A$ ) if coefficient estimate of Total loans and advances is not positively signed and statistically insignificant (i.e.  $p > 0.5$  or  $t_c \leq 2.0$ ).

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20	Time: 01:18			
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	93.520128	220.930599	0.4233009	0.6761852
TLADV	0.291260	0.08427526	3.4560545	0.0022489
GDP	-0.274966	0.11475587	-2.3960986	0.0255091
INFR	1.536985	7.40525438	0.2075533	0.8374870
R-squared	0.59960096	Mean dependent var		608.86732
Adjusted R-squared	0.54500109	S.D. dependent var		791.01005
S.E. of Regression	533.564811	Akaike info criterion		403.41390
Sum square resid	6263210.97	Schwarz criterion		406.09728
Log likelihood	-198.161496	Hannan-Quinn criterion		393.06490
F-statistic	10.981729	Durbin- Watson stat		1.5782585
Prob(F-statistic)	0.0001			

*Table 13: Regression Result of Hypothesis Three**Source: Researcher's Compilation (2020)*

Table 13 presents the impact of Total loans and advances (TLADV) on Non-performing loans in the Nigerian banking industry. As revealed from the table, the coefficient estimate of TLADV is 0.2913 showing that the variable had a positive impact on the value of non-performing loans (NPLs) in the period under review, with the gross domestic product (GDP) and inflation rates (INFR) as control variables. The result indicates that an increase in the TLADV by one unit increases the NPLs by 0.913 billion nairas on average per annum. The statistical properties of the result are satisfactory, as can be inferred from the R-squared value of 0.5996 (59.96%), which shows that the TLADV, GDP and INFR variables explained about 60% of the total variations in the NPLs within the period under review. Also, the probability of the F-statistic (0.0001<0.05) shows that the joint impact of the explanatory variables, taken together, is statistically significant at the 5% level. Similarly, the Durbin-Watson value of 1.58, which is close to 2.0, is an indication of the absence of serial correlation (autocorrelation) in the estimated regression model.

#### 4.3.3.3. Step Three: Conclusion

Since the coefficient estimate of the Total loans and advances variable is positively signed (0.291260) and statistically significant at the 5% level (p-value of 0.0001< 0.05 or tc of 3.456054 > 2), we accept HA and accordingly reject H0. We conclude that total loans and advances have a significant impact on non-performing loans in the Nigerian banking industry.

#### 4.3.4. Hypothesis Four

##### 4.3.4.1. Step one: Restatement of the Hypothesis in Null and Alternate Forms

- H0: Total Assets do not have a significant impact on Non-performing Loans in the Nigerian banking industry.
- HA: Total Assets have a significant impact on Non-performing Loans in the Nigerian banking industry.

##### 4.3.4.2. Step Two: Decision Rule and Analysis

- Accept HA (and reject H0) if the coefficient estimate of Total Assets is negatively signed and statistically significant (i.e., p < 0.5 or tc ≥ 2.0).
- Accept H0 (and reject HA) if the coefficient estimate of Total Assets is not negatively signed and statistically insignificant (i.e., p > 0.5 or tc ≤ 2.0).

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20 Time: 01:18				
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	218.023955	161.633253	1.3488806	0.1910969
TA	0.050248	0.03716222	1.3521387	0.1900684
TLADV	0.276413	0.08161282	3.3868781	0.0026531
GDP	-0.427448	0.15751151	-2.7137597	0.0126806
R-squared	0.62959863	Mean dependent var	608.86732	
Adjusted R-squared	0.57908935	S.D. dependent var	791.01005	
S.E. of Regression	513.188555	Akaike info criterion	401.38917	
Sum square resid	5793974.85	Schwarz criterion	404.07255	
Log likelihood	-197.149128	Hannan-Quinn criterion	391.04016	
F-statistic	12.465009	Durbin- Watson stat	1.7890834	
Prob(F-statistic)	0.0001			

*Table 14: Regression Result of Hypothesis Four*

Source: Researcher's Compilation (2020)

Table 14 presents the impact of Total Assets (TA) on Non-performing loans in the Nigerian banking industry. As the table shows, the coefficient estimate of TA is 0.050 showing that the variable had a positive impact on the value of non-performing loans (NPLs) in the period under review, with Total loans and advances (TLADV) and Gross domestic product (GDP) as control variables. The result indicates that an increase in the TA by one unit increases the NPLs by about 0.05 billion nairas on average per annum. The statistical properties of the result are satisfactory, as can be inferred from the R-squared value of 0.629 (62.9%), which shows that the TA, TLADV and GDP variables explained about 63% of the total variations in the NPLs within the period under review. Also, the probability of the F-statistic (0.0001<0.05) shows that the joint impact of the explanatory variables, taken together, is statistically significant at the 5% level. Similarly, the Durbin-Watson value of 1.79, which is less than 2.0, is an indication of the absence of serial correlation (autocorrelation) in the estimated regression model.

#### 4.3.4.3. Step Three: Conclusion

Since the coefficient estimate of the Total Assets variable is positively signed (0.050248) and statistically insignificant at the 5% level (p-value of 0.1900> 0.05 or tc of 1.35213 < 2), we reject HA and accordingly accept H0. We conclude that total asset does not have a significant impact on non-performing loan in the Nigerian banking industry.

#### 4.3.5. Hypothesis Five

##### 4.3.5.1. Step One: Restatement of the Hypothesis in Null and Alternate Forms

- H0: Bank Lending Rate does not have a significant impact on Non-performing loans in the Nigerian banking industry.
- HA: Bank Lending Rate has a significant impact on Non-performing loans in the Nigerian banking industry.

##### 4.3.5.2. Step Two: Decision Rule and Analysis

- Accept H0 (and reject H0) if the coefficient estimate of the Bank lending rate (BLR) is positively signed and statistically significant (i.e.,  $p < 0.5$  or  $tc \geq 2.0$ ).
- Accept H0 (and reject HA) if the coefficient estimate of the Bank lending rate (BLR) is not positively signed and statistically insignificant (i.e.,  $p > 0.5$  or  $tc \leq 2.0$ ).

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20	Time: 01:28			
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob
C	-399.015081	944.817867	-0.4223196	0.6768906
BLR	19.967565	43.19788490	0.4622348	0.6484518
TLADV	0.153825	0.07770743	1.9795455	0.0604019
TA	-0.028220	0.03307611	-0.8531830	0.4027517
R-squared	0.51036220	Mean dependent var		608.86732
Adjusted R-squared	0.44359341	S.D. dependent var		791.01005
S.E. of Regression	590.035494	Akaike info criterion		408.64521
Sum square resid	7659121.44	Schwarz criterion		411.32859
Log likelihood	-200.777152	Hannan-Quinn criterion		398.29621
F-statistic	7.643724	Durbin- Watson stat		1.4513362
Prob(F-statistic)	0.0011			

Table 15: Regression Result of Hypothesis Four  
Source: Researcher's Compilation (2020)

Table 15 presents the impact of Bank lending rate (BLR) on Non-performing loans in the Nigerian banking industry. As the table shows, the coefficient estimate of BLR is +19.967 showing that the variable had a positive impact on the value of non-performing loans (NPLs) in the period under review, with Total loans and advances (TLADV) and Total assets (TA) as control variables. The result indicates that an increase in the BLR by one percent increases the NPLs by about 19.967 billion nairas, on average per annum. The statistical properties of the result are satisfactory, as can be inferred from the R-squared value of 0.5103 (51.03%), which shows that changes in the BLR, TLA and TA variables explained about 51% of the total variations in the NPLs within the period under review. Also, the probability of the F-statistic (0.00<0.05) shows that the joint impact of the explanatory variables, taken together, is statistically significant at the 5% level. Similarly, the Durbin-Watson value of 1.45, which is lower than 2.0, is an indication of the absence of serial correlation (autocorrelation) in the estimated regression model.

#### 4.3.5.3. Step Three: Conclusion

Since the coefficient estimate of the Bank lending rate (BLR) variable is positively signed (19.96755) but statistically insignificant at the 5% level (p-value of 0.6484> 0.05 or tc of 0.462234< 2), we reject HA and accordingly accept H0. We conclude that bank lending rate does not have a significant impact on non-performing loans in the Nigeria baking industry.

#### 4.4. Implications of Results

##### 4.4.1. Implication from Objectives

The estimated model used financial or bank-specific variables – Total loans and advances and Total assets – and three other variables which reflect the economic situation of the country – Real gross domestic product, Inflation rates and Bank lending rate – to examine the determinants of Non-performing loans (NPLs) in the banking industry in Nigeria. Studies that used similar variables include:

- Jimenez and Saurina (2005),
- Rinaldi and Sanchis-Arellano (2006),
- Dash and Kabra (2010),
- Pasha, S., and Khemraj, T. (2009), and
- Masood (2009)

Discussion of the findings is presented one variable at a time.

##### 4.4.1.1. Objective One: The impact of gross domestic product on non-performing loans in the Nigerian Banking Industry

Our study finds a negative association between gross domestic product (GDP) and Non-performing loans (NPL) in the Nigerian banking industry, a result that is significant at the 5% level. According to Farhan et al. (2012), there is significant empirical evidence of negative association between growth in gross domestic product and non-performing loans such as Louzis, Vouldiz and Metaxas (2011), Khemraj and Pasha (2009), Salas and Saurina (2012), Rajan and Dhal (2003), Fofack (2005) and Jimenez and Saurina (2005). The result of the present study is in line with those. The negative relationship between these two variables has been explained in literature as well. Growth in the GDP usually increases the income, which ultimately enhances the loan repayment capability of the borrower, which in turn contributes to lower bad loans and vice versa (Khemraj & Pasha, 2009).

Bofandi and Ropele (2011), Demirguc-Kunt and Detragiache (1998), Hardy and Pazarbasioglu (1998) and Shu (2002) all found GDP to be negatively related to Non-performing loans and significant as well. Looking at the data, we notice instances where NPLs dropped with sharp increases in the GDP. In 2005, for instance, NPL dropped about 36 percent over the 2004 value in the entire banking industry, whereas GDP rose 28 percent in the same period. The same was the case in 2010, with a 63 percent drop in NPL and a 119 percent increase in GDP over the previous year. A similar record is evident in 2012 over 2011. The result, therefore, aligns itself with robust literature which admits changes in gross domestic product as a strong determinant of non-performing loans.

#### 4.4.1.2. Objective Two: The Impact of Inflation Rate on Non-Performing Loans in the Nigerian Banking Industry

As in previous studies, inflation has been considered a determinant of Non-performing loans in developed and emerging markets. Nkusu (2011) has explained that the relationship between both variables can be positive or negative. According to the author, inflation affects the loan repayment capacity of borrowers positively or negatively: higher inflation can enhance the loan repayment capacity of borrowers by reducing the real value of outstanding debt. Increased inflation can also weaken the loan repayment capacity of the borrowers by reducing the real income when salaries/wages are sticky. Moreover, by highlighting the role of inflation in the presence of variable interest rates (or bank lending rates), Nkusu further explains that in this scenario, inflation reduces the debt servicing capacity of the loans as lenders adjust the lending interest rates to adjust their real return. According to literature, the relationship between inflation and a non-performing loan can be positive or negative depending on the economy of operations (Farhan et al., 2012).

The present study finds a positive relationship between the inflation rate and Non-performing loans in Nigeria over the past two decades. Other studies with similar results include Khemraj and Pasha (2009), Fofack (2005), Hoggarth, Sorensen and Zicchino (2005), Vogiazas and Nikolaïdou (2011), Shu (2002), Adebola et al. (2011), Muniappan (2002), Sofolis and Sftychia (2011). Unlike most of these studies, which find that the inflation rate significantly impacts Non-performing loans, the present study finds that the impact of inflation rates is not significant at conventional levels. Within the last two decades, inflation rates in Nigeria averaged 16.66%, with the highest rate of 72.8% (in 1995) and the lowest rate of 3.29% (in 2000). Since 2009 inflation rates have fallen consistently, showing relative stability in the general price level of goods and services in the country. Although literature has shown that whether the impact of inflation is positive or negative, it may mean well for reducing non-performing loans. However, our data shows that at the same time when inflation dropped consistently between 2009 and 2014, non-performing loans in the banking industry rose, although at a slower rate since 2011. The implication is that efforts to keep the inflation rate lower should be pursued to bring down the value of non-performing loans in Nigeria even lower.

#### 4.4.1.3. Objective Three: The Impact of Total Loans and Advances of Banks on Non-Performing Loans in the Nigerian Banking Industry

Higher total loans and advances over successive years may be an indication of indiscriminate lending, which in turn heightens the likelihood of repayment default. Our study finds a positive and highly significant relationship between Total loans and advances (TLADV) and Non-performing loans (NPLs) in the banking industry in Nigeria. Dash and Kabra (2010), Louzis, Vouldis and Metaxas (2010) and Masood (2009) are examples of studies that incorporated the effect of TLA on NPLs and found strong associations between both variables. Between 1994 and 2019 TLA averaged N5,989.77 billion per annum, with the highest values coming in 2019 to the tune of N17,187.77 billion and the lowest N94.18 billion in 1994. Within the same time, NPL averaged N608.87 billion per annum, with the highest figure coming in 2009. In 2009, NPL represented about 33% of TLADV and between 2010 and 2019 the percentages were 14%, 5%, 4%, 3%, 3%, 5%, 13%, 15%, 12% and 6%, respectively. This indicates that NPL as a percentage of TLA has been relatively stable, but the fact remains that higher TLA over a period of time means more debts could go doubtful or even bad, as happened during the fall in oil prices from 2015.

In order to check indiscriminate lending, banks in Nigeria can take a cue from the experience of the USA. McGovern (1993) examined the case of the USA and noted that 'character' has historically been a paramount factor of credit and a major determinant in the decision to lend money. Banks have suffered loan losses through relaxed lending standards, unguaranteed credits, and the borrowers' perceptions. As the author suggested, banks in Nigeria should always make a fairly accurate personality-morale profile assessment of prospective and current borrowers and guarantors. In addition to considering personal interaction, banks should:

- Study the intending borrower's personal credit report,
- Do trade-credit enquiries,
- Statute enquiries from present and former bankers and
- Determine how the borrower handles stress

In addition, banks can minimize risks by securing the borrower's guarantee, using government-guaranteed loan programmes, and requiring conservative loan-to-value ratios.

#### 4.4.1.4. Objective Four: Impact of Total Assets of Banks on Non-Performing Loans in the Nigerian Banking Industry

Our study finds a negative relationship between Total assets (TA) and Non-Performing Loans (NPLs) in the banking industry in Nigeria – a result that is statistically significant at the 10% level. Banks face insolvency due to declining values of total assets when bank borrowers cannot repay their debt due to adverse shocks to economic activity (Demirguc-Kunt & Detriagache, 1995; Hardy & Pazarbasioglu, 1998). Thus, when loans are repaid, they add to the banks' assets base and reduce overall non-performing loans.

Arellano (2006) also found total assets to be a key determinant of non-performing loans. In practical terms, the banking industry in Nigeria has benefited from an enhanced assets base in recent times, especially following the recapitalization policy of 2005. Between 1994 and 2009 also, the banking industry reflected a substantial rise in the general quality of assets and in non-performing loans, suggesting that the quality of total assets had influenced the level of NPLs. This was due perhaps to the less effective bank reform policies prior to that time which could not address the issues of credit expansion emanating from the growth in the asset qualities of banks. This situation escalated and eventually culminated in the failure of most banks by 2005.

As noted earlier, it is a sign of stability when banks increase their assets base significantly such that they can afford to raise provisions for doubtful debts and eventually write these off. Thus the net effect of rising total assets in the banking industry is a reduction in the total value of non-performing loans. The findings are in line with Hu et al. (2006), who employed total assets as a proxy for bank size and found that bank size is negatively related to non-performing loans in Taiwan.

#### **4.4.1.5. Objective Five: Impact of Banks' Lending Rates on Non-Performing Loans in the Nigerian Banking Industry**

The study finds a direct relation between Bank lending rates and Non-Performing loans. This implies that NPLs are higher during periods of higher lending rates and lower during periods of lower lending rates, with everything else remaining the same in the banking industry in Nigeria. The finding is consistent with numerous studies. Lawrence (1995) noted that banks charge higher interest rates to riskier clients and if a high-interest rate is charged to those borrowers who already have a substandard record of repaying the loans is also a factor contributing to the growth of NPLs (Farhan et al, 2012). The result contrasts, however, with Bofondi and Ropele (2011), who found lending rates to be negatively associated with NPLs in Italy, perhaps because they used quarterly data instead.

The fact that lending rates are an important determinant of NPLs is also proved by Berge and Boye (2007), who found that NPLs are highly correlated with the lending rates for the Nordic banking system. This singular variable has been termed 'primary determinant' of NPLs or bad loans and all with evidence of a positive relationship (Louzis, Vouldis & Metaxas, 2011; Nkusu, 2011; Adebola, Yosoff & Dehalan, 2011; Berge & Boye, 2007). A rise in lending/interest rate weakens the loan repayment capacity of the borrower. Therefore, non-performing loans are positively associated with the interest rate. This goes to show that interest rate policy plays a very crucial role in the growth or decline of NPLs in Nigeria. Hoque and Hossain (2008), Bloem and Gorter (2001), Asari et al (2011), Dash and Kabra (2010), Collins and Wanjau (2011) all found that high lending rates enhance the debt burden on the borrower and cause loan defaults or that banks with aggressive lending policies charging high-interest rates from the borrowers incur greater non-performing loans. However, perhaps the result closest to that of the present study is Espinoza and Prasad (2010), who, in addition, did not find a statistically significant relation (Farhan et al, 2012) as in the present study.

#### **4.4.2. Policy Implication of Findings**

Having thoroughly explained the result, conducted the diagnostics test and shown the outcome of the hypothesis tested, it is imperative that we make an attempt to show what policy implications are associated with the results of the study. The study analyzed the determinants of Non-performing loans using response variables reflecting conditions in Nigeria's monetary system and the economic environment. The result shows a negative association between economic growth with real Gross Domestic Product as a proxy and Non-performing Loans in the Nigerian banking industry. This implies that policy measures in favour of sustained economic growth are essential to achieve a significant reduction in the volume of non-performing loans in the country's banking sector.

The study also finds that inflation exerts a positive influence on non-performing loans in Nigeria's banking sector within the last two decades. Rising inflation thus increases the likelihood of loan repayment default. This implies that monetary authorities in Nigeria should pursue policies targeting lower inflation rates because the present level neither encourages nor facilitates loan repayment in the country.

It is obvious that Non-performing loans are an aspect of total loans and advances and the study rightly finds a positive relationship between these two. This means that rising total loans and advances increase the chances of bad loans such as non-performing loans. The study finds that the effect of this variable is highly significant, showing that the indiscriminate lending habit of commercial banks in the country in the last two decades has mostly led to the eventuality of loan repayment default in the banking sector. Therefore measures that tighten up the process of granting loans and advances are necessary to curb the height of non-performing loans in the banking sector.

Bank Total asset is another response variable that has a significant negative effect on non-performing loans in the banking sector in Nigeria. An increase in total assets, for instance, results in higher stability which might lead to writing off some non-performing loans without the risk of bank failure. Hence banks who acquire more assets stand better chances of reducing non-performing loans.

Finally, the result shows that bank lending rates have a positive impact on the non-performing loans in Nigeria's banking sector. This is a monetary phenomenon. An increase in lending rates discourages borrowing and reduces aggregate investment in the economy, which is an indication of low economic activity. This makes it difficult for holders of non-performing loans to repay their debts. Furthermore, high lending rates imply high interest on loans and this increases the risk of non-repayment. Hence monetary authorities in Nigeria should take measures to ensure lower lending rates, although this must be done in line with prevalent economic situations.

## 5. Summary of Findings, Policy Implication, Conclusion and Recommendation

### 5.1. Summary of Findings

The summary of the findings from the estimated model function is as follows:

- The gross domestic product had a negative and significant impact on non-performing loans 2. The inflation rate had a positive but insignificant impact on non-performing loans.
- Total loans and advances had a positive and statistically significant impact on non-performing loans.
- Total Assets exerted a negative impact on non-performing loans and are not statistically significant at the 0.05 level but are significant at the 0.1 level.
- Bank lending rate had a positive impact on non-performing loans and is insignificant at conventional levels.

### 5.2. Conclusion

Commercial banks cannot do without granting loans. However, rising non-performing loans (NPLs) is not for the good of the monetary or financial sector in particular and the macroeconomy in general due largely to its spill over effects. To achieve the ultimate objective of wiping out the incidence of NPLs in our banking industry requires that factors driving NPLs should be identified and tackled through appropriate policies. The study, therefore, is a fresh attempt to ascertain the determinants of Non-performing loans to the Nigerian banking industry and the impact the credit bureau agencies have had since being promulgated to perform this function by the act in 2008.

Literature suggests that the determinants of Non-performing loans come under two major headings: bank-specific variables and macro-economic variables (Ekanake & Ezeez, 2015). Consequently, the study model included banks' total loans and advances, total assets, real gross domestic product, inflation rates and bank lending rates (interest rates) as variables of interest. Data on the bank-specific variables are aggregate values representing the aggregate banking industry in Nigeria. While a review of empirical studies appears to suggest a specific relationship between certain variables and non-performing loans, consensus cannot be reached regarding the impact of others. Bloem and Gorter (2001), therefore, argue that the impact of the latter variable is determined by preventing economic situations.

Overall our study finds that total loans and advances have the most pronounced impact on non-performing loans in the Nigerian banking industry. By total loans and advances, we mean the value of all credits extended by banks which increases with the total number of loans and advances granted. The greater the number of loans and advances, the higher the probability of loan repayment default. This explains why there is a positive relationship between the two variables. Besides total loans and advances, there is the total asset. The latter has a significant impact on the Non-performing loans in Nigeria's banking sector. The relationship is negative, which implies that growth in the industry's total assets base goes a long way to cutting down the value of non-performing loans. We also find that an increase in the country's real national income significantly reduces Non-performing loans, although not as strong a relation as the aforementioned. It has been shown how the results relate to or differ from previous studies.

Factors that have an insignificant impact on the Non-performing loan in Nigeria include inflation rates and bank lending rates, both with a positive impact on the dependent variable. Throughout our discussion, we have shown what each of these factors means for Non-performing loans in the Nigerian banking industry. The result of the study passed relevant diagnostics tests, which show that the bank-specific factors are significant at the 5% level, whereas the macroeconomic factors are not. The study, therefore, concludes that bank-specific factors drive changes in or determine Non-performing loans more than macroeconomic factors in Nigeria. This should affect the direction of economic policies in the country.

Credit bureau agencies have not been able to influence the level of NPL in the industry because consumer loans are just about 6% of banking industry loans and advances. According to statistics by Central Bank of Nigeria (CBN), the value of consumer loans moved from N584 billion in 2012 to N786 billion in 2015. This is 35 percent growth in three years.

However, if we situate consumer loans as a proportion of total loans to the private sector, it gives a different picture. The total consumer loans of N584 billion in 2012 were about 7 percent of total loans to the private sector, whereas the N786 billion consumer loans in 2015 were just 6 percent of the total loans to the private sector. These statistics point to the fact that, in absolute terms, we see growth, but in relative terms, the growth is not commensurate with the overall loan growth as more and more of the loans still go to large corporate and commercial entities. It can be seen that credit reports, while it has helped in the growth of consumer loans in the industry, the proportion of this level of loans means that it has not materially affected the level of non-performing loans in the banking sector.

### 5.3. Recommendations

Based on the findings, the study makes the following recommendations:

- Since the result in table 11 shows that changes in Nigeria's GDP have a significant negative impact on non-performing loans, macroeconomic policies should be directed at sustaining economic growth as it curbs non-performing loans in the banking industry.
- The result equally shows that high inflation rates in the country increase the incidence of non-performing loans, as in table 12. Monetary authorities should ensure stable inflation rates and target lower rates to reduce non-performing loans.
- Since the study also finds that a rise in total loans and advances would mean higher non-performing loans, it is, therefore, necessary that regulatory and monetary institutions employ special directives aimed at controlling the indiscriminate granting of loans in the banking industry.

- Because the study finds that higher bank lending rates translate to a higher risk of defaulting and then higher non-performing loans, it is recommended that monetary policy be relaxed to reduce non-performing loans and advances.
- The current national identity management system project with a robust general identity database should be sustained by the Federal Government. The Bank Verification Number (BVN) of the Central Bank of Nigeria, which has been used in linking customer accounts industry-wide, is a great landmark in the Nigerian Banking Industry's recent reform. A borrower's multiple accounts have now been linked by the BVN and the Banks can legally exercise their right of set-off on all the qualifying accounts. Total loans and advances would thus be reduced and so would non-performing loans.

#### **5.3.1. Recommended for Further Studies**

- Further studies may focus on the impact of social and political factors on non-performing loans in Nigeria.
- The Impact of Non-Performing Loans on Banks Profitability in Nigeria.
- The Impact of Bank Verification Number (BVN) in collaboration with National Identity Management Commission (NIMC) on reducing Non-Performing Loans.

#### **5.3.2. Contribution to Knowledge**

Non-Performing Loans are not only a contributor to the failure of banking operations in Nigeria but a major cause of banking failure globally. By the empirical analysis conducted, this study contributes to knowledge by using a model which captures determinants of non-performing loans peculiar to an emerging economy like Nigeria. By modifying the model originally used by Pasha and Khemraj (2010) to include macroeconomic and bank-specific variables, the study shows that Total loans and advances, Total assets, and Gross domestic product are strong determinants of NPLs in the Nigerian banking industry more than Inflation rates and Bank lending rates. Again this study stands out significantly in terms of geography. Most works in this area of finance and banking are found in developed economies. To the best of the researcher's knowledge, not much research has been conducted in this area in developing economies. The present study, therefore, enriches the scanty literature by providing a thorough analysis of the factors which influence the existence of non-performing loans in an emerging economy such as Nigeria.

#### **6. Acknowledgement**

I would like to express my special thanks of gratitude to my tutor Schadrack Imanishimwe for the continuous support of my Bachelor's degree study and research, for his patience, motivation, enthusiasm, and immense knowledge. as well as other members of the academic advisory team of the institution who gave me the golden opportunity to do this wonderful project on the topic "The impact of credit bureau on the non-performing loans situation in the Nigerian banking landscape," which also helped me in doing a lot of Research and I came to know about so many new things I am really thankful to them.

Secondly, I would also like to thank my colleagues and friends who helped me a lot in finalizing this project within the limited time frame.

Besides my advisor, I would like to thank the rest of my tutors at AIU, who have contributed in no small way in ensuring that I attain my set goal.

Last but not the least, I would like to thank my family: my wife, Amaka Samuel-Okon and daughter Claire Samuel-Okon, for supporting me throughout this journey.

#### **7. References**

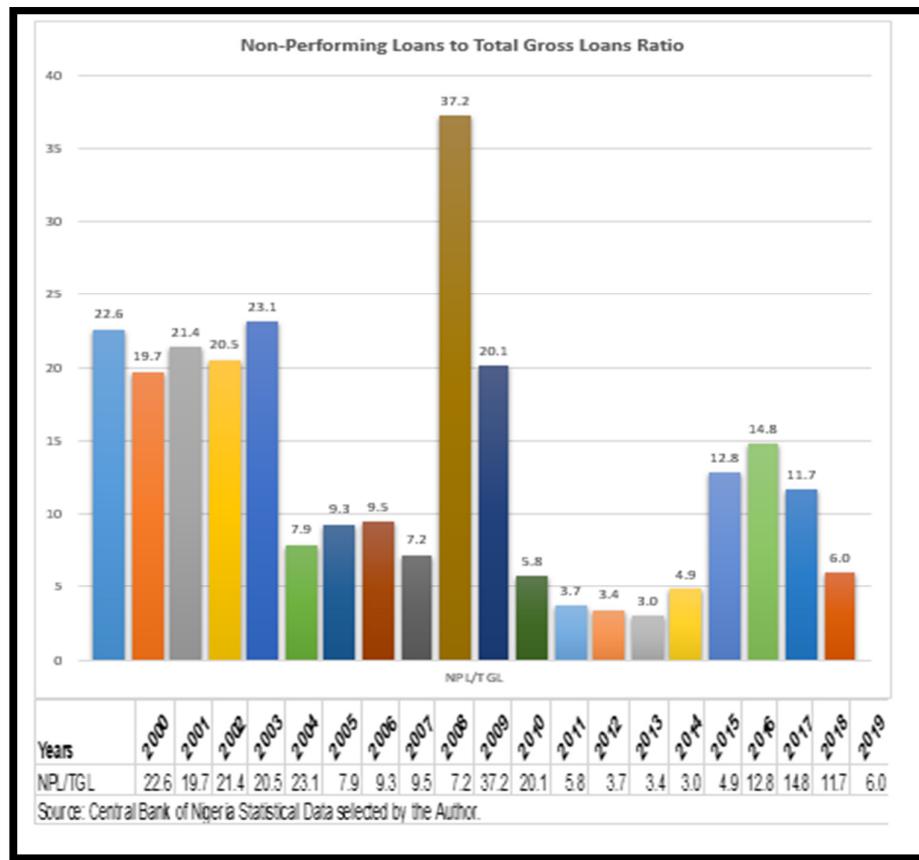
- i. Adedipe, B. (2006). Capital account liberalization: What option for developing economies? *Central Bank of Nigeria Economic and Financial Review*, 44(4), December.
- ii. Agung, J., et al. (2001). Credit crunch in Indonesia in the aftermath of the crisis: Facts, causes, and policy implications. *Directorate of Economic Research and Monetary Policy, Bank of Indonesia*, March.
- iii. Ahmed, M. (1997). The political economy of loan default: A quest for a socio-political explanation. *Bank of Parikrama, BIBM*, 21(2), Dhaka, Bangladesh.
- iv. Alam, N., & Jahan, S. B. (1999). Default culture in banking sector. *Bank Parikrama*, 25(1), Dhaka, Bangladesh.
- v. Alary, D., & Goller, C. (2001). Strategic default and penalties on the credit market with potential judgment errors. *EUI Working Paper*.
- vi. Altman, E. I., & Anthony, S. (2001). An analysis and critique of the BIS proposal on capital adequacy and ratings. *Journal of Banking and Finance*, 25(46).
- vii. Anderson, R., & Sundaresan, S. (2000). A comparative study of structural models of corporate bond yields: An explanatory investigation. *Journal of Banking and Finance*, 24, 55–69.
- viii. Angbazo, L. (1997). Commercial bank net interest margins, default risk, interest-rate risk, and off-balance sheet banking. *Journal of Banking and Finance*, 21(1), 55–87.
- ix. Aremu, O., Suberu, J., & Oke, J. (2010). Effective credit processing and administration as a panacea for non-performing assets in the Nigerian banking system. *Kre Journal of Economics*, 1(1), 53–56.
- x. Ariff, M., & Marisetty, V. B. (2001). A new approach to modelling multi-country risk premium using panel data test method. *Proceedings of MFS conference in Cyprus*.
- xi. Arnold, J. D., & Quelch, A. J. (1998). New strategies in emerging markets. *Sloan Management Review*, 40(1).

- xii. Asari, F. F. A. H., Muhammad, N. A., Ahmad, W., Latif, N. I. A., Abdullah, N., & Jusoff, K. (2011). An analysis of non-performing loan, interest rate, and inflation rate using Stata software. *World Applied Sciences Journal*. Retrieved from: <http://www.imf.org/external/pubs/ft/wp/2010/wp10224.pdf>
- xiii. Auronen, L. (2003). Asymmetric information: Theory and applications. Paper presented in the Seminar of Strategy and International Business at Helsinki University of Technology, May 21, 2003.
- xiv. Bank for International Settlements. (2010). The Basel committee's response to the financial crises report to G20. Retrieved from: <http://www.bis.org/publ/bcbs179.pdf>
- xv. Barr, R. S., & Siems, T. F. (1994). Predicting bank failure using DEA to quantify management quality. *Federal Reserve Bank of Dallas, Financial Industry Studies Working Paper*. Retrieved from: <http://idea.repec.org/p/feddfi/94-1.html>
- xvi. Basel Committee on Banking Supervision. (1996). Amendment to the capital accord to incorporate market risks. *BCBS Basel Committee Publications*, 24.
- xvii. Basel Committee on Banking Supervision. (2000). Credit rating and complementary sources of credit quality information. *Basel Committee on Banking Supervision Working Paper, No. 3*.
- xviii. Belsley, D. A., Kuh, E., & Welsch, R. E. (1980). Regression diagnostics: Identifying influential data and sources of collinearity. *New York: John Wiley and Sons*.
- xix. Bereridge, W. Z. B. (1953). *The art of scientific investigation*. Vintage Books, New York.
- xx. Berger, A. N., & De Young, R. (1997). Problem loans and cost of efficiency in commercial banks. *Journal of Banking and Finance*, 21, 849–870.
- xxi. Berger, A. N., & Humphrey, D. B. (1992). Megamergers in banking and the use of cost efficiency as an antitrust defense. *The Antitrust Bulletin*, 37(3), 541–600.
- xxii. Bester, H. (1994). The role of collateral in a model of debt renegotiation. *Journal of Money, Credit and Banking*, 26(1), 72–86.
- xxiii. Blaauw, A. J. (2009). Market risk management in Nigeria. *Africa's Global Bank*.
- xxiv. Bloem, A. M., & Gorter, C. N. (2001). The treatment of non-performing loans in macroeconomic statistics. *IMF Working Paper, WP/01/209*.
- xxv. Bofondi, M., & Gobbi, G. (2003). Bad loans and entry in local credit markets. *Bank of Italy Research Department, Rome*.
- xxvi. Boss, M. (2002). A macroeconomic credit risk model for stress: Testing the Austrian credit portfolio. *OeNB, Financial Stability Report*, 4.
- xxvii. Brownbridge, M. (1998). The cause of financial distress in local banks in Africa and implications for prudential policy. *UNCTAD/OSG/DP/132*.
- xxviii. Brownbridge, M., & Harvey, C. (1998). Banking in Africa: The impact of financial sector reform since independence. Nairobi: Africa World Press.
- xxix. Caprio, G. Jr., & Levine, R. (2002). Corporate governance of banks: Concepts and international observations. Paper prepared for the 2002 World Bank, IMF and Brookings Institution Conference, *Building the Pillars of Financial Sector Governance: The Roles of Public and Private Sectors*.
- xxx. Caprio, J., & Klingebiel, D. (2002). Episodes of systemic and borderline financial crises. In D. Klingebiel & L. Laeven (Eds.), *Managing the Real and Fiscal Effect of Banking Crisis*. Washington, DC: World Bank Discussion Paper No. 428, 132–145.
- xxxi. Central Bank of Nigeria (CBN). (2010). Global financial meltdown and reforms in the Nigerian banking sector. Central Bank of Nigeria Governor's speech, delivered at ATBU convocation, Bauchi, on December 10.
- xxxii. Central Bank of Nigeria (CBN). (2013, September 19). Central Bank of Nigeria moves against unethical practices in banks. *Business Day*.
- xxxiii. CBN/NDIC. (1995). *Distress in the Nigerian financial services industry*. Central Bank of Nigeria/Nigerian Deposit Insurance Corporation collaborative study.
- xxxiv. Cebenoyan, A., Sinan, & Strahan, P. E. (2004). Risk management, capital structure and lending at banks. *Journal of Banking and Finance*, 28, 19–43.
- xxxv. Central Bank of Nigeria/Nigerian Deposit Insurance Corporation. (1995). *Distress in the Nigerian financial services industry*. CBN/NDIC collaborative study. Retrieved on 19/08/2013.
- xxxvi. Central Bank of Nigeria. (2009). *Statistical bulletin*. Retrieved from: <http://www.cbng.gov.ng/> on 21/05/2012.
- xxxvii. Central Bank of Nigeria. (2010). *Prudential guidelines for licensed banks*. Banking Supervision Department, June. Retrieved from: <http://www.cbng.gov.ng/>.
- xxxviii. Central Bank of Nigeria. (2011). *CBN annual report*. Retrieved from: <http://www.cenbank.org/AR2011/DEFAULT.ASP>.
- xxxix. Clarke, M. R. B. (1982). Algorithm as 178: The Gauss-Jordan sweep operator with detection of Collinearity. *Journal of Applied Statistics*, 31(2), 166–168.
- xli. Cohen, L., Manion, L., & Morison, K. (2000). *Research methods in education*. London: Routledge Falmer.
- xlii. Collin-Dufresne, P., & Goldstein, R. (2001). Do credit spreads reflect stationary leverage ratios? *Journal of Finance*, 51, 1929–1957.
- xlii. Crowley, J. (2007). Interest rate spreads in English-Speaking African countries. IMF Working Paper, WP/07/101.
- xliii. Das, A., & Ghosh, S. (2003). Determinants of credit risk. Paper presented at the conference on Money, Risk and Investment held at Nottingham Trent University in November.

- xliv. Demirguc-Kunt, A., & Huizanga, H. (1998). Determinants of commercial bank interest margins and profitability: Some international evidence. Development research group, the World Bank, center and department of economics, Tilburg University.
- xlv. Fofack, H. (2005). Non-Performing loans in sub-Saharan Africa: Casual analysis and macro-economic implications. *World Bank Policy Research Working Paper 3769*, November.
- xlvi. Gabriel, O., & Babajide, K. (2009). CBN sacks 5 bank CEOs, appoints acting MD/CEOs. *Vanguard*, August 14.
- xlvii. Hutchinson, G. D. (2011). Ordinary least square regression. In L. Moutinho & G. D. Hutchinson, *The sage dictionary of quantitative management research* (pp. 224–228).
- xlviii. International Monetary Fund. (2007). *Global financial stability report-financial market turbulence: Causes, consequences, and policies*. IMF World economic and financial surveys.
- xlix. International Monetary Fund. (2012). *Global financial stability report: Issues and economics*. Working Paper Archive wp\_110.
- l. Kama, U. (2006). Recent reforms in the Nigerian banking industry: Issues and challenges. *Bullion*, publication of the Central Bank of Nigeria, Vol. 30, No. 3, July-Sept.
- li. Moghalu, C. K. (2013). Risk management still at rudimentary stage in Nigeria. *This Day*, May 2, 2012, updated, Tuesday, July 16.
- lii. NDIC. (1991). Report on manpower satiation in the Nigerian Banking Industry. *NDIC Annual Report*.
- liii. Nigerian Deposit Insurance Corporation. (2009). *Annual report and statement of account*. Retrieved from: <http://www.ndic.ng/>.
- liv. Nigerian Deposit Insurance Corporation. (2010). *Annual report and statement of account*. Retrieved from: <http://www.ndic.ng/>.
- lv. Olajide, B. (2011). Risk management: The travails of Nigerian banks. *The Guardian*, Tuesday, July 16.
- lvi. Owujori et al. (2011). The challenge of risk management in Nigerian banks in the post-consolidation era. *Journal of Accounting and Taxation*, Vol. 3(2), 23–31, June 2011.
- lvii. Somoye, R. O. C. (2010). The variation of risks on non-performing loans on bank performance in Nigeria. *Indian Journal of Economics and Business*, March.
- lviii. Steve, O., & John, O. (2013). Nigerian banks failing to meet global risk requirements. *Business Day*, Wednesday, January 23.
- lix. Umoh, P. N. (2002). An overview of risk management practices in the Nigerian banking industry. *NDIC Q.*, 12(4), 36–48.
- lx. Morakinyo, A. E., & Sibanda, M. (2016). Non-Performing Loans and Economic Growth in Nigeria. *SPOUDAI Journal of Economics and Business*, Vol. 66(4), 61–81.
- lxi. Ozurumba, B. A. (2016). Impact of Non-Performing Loans on the Performance of Selected Commercial Banks in Nigeria. *Research Journal of Finance and Accounting*, Vol. 7(16), 95–109.

## Appendix

### 1. Banks' Non-Performing Loans to Total Gross Loans (%)



#### 1.1. Data

YEAR	NPL	GDP	INFR	TLADV	TA	BLR	ECM
1994	-	176.28	57.00	94.18	469.32	21.00	-167.42
1995	-	289.52	72.80	144.57	410.65	20.79	-119.75
1996	-	377.91	29.30	169.44	443.25	20.86	-105.46
1997	-	411.16	17.57	385.55	470.64	23.32	-221.63
1998	63.30	458.90	8.11	272.90	647.72	21.34	-64.69
1999	94.79	530.74	9.11	322.76	890.36	27.19	-177.44
2000	111.57	689.75	3.29	508.30	1,201.47	21.55	-14.76
2001	135.74	813.41	15.62	796.16	488.44	21.34	20.36
2002	199.62	1,133.23	16.18	954.63	1,546.35	30.19	-96.26
2003	260.19	1,330.16	11.20	1,210.03	2,868.92	22.88	106.20
2004	350.82	1,732.13	17.62	1,519.24	3,416.23	20.82	314.02
2005	225.08	2,227.00	14.73	1,976.71	8,286.69	19.49	94.51
2006	387.99	2,866.25	13.54	2,524.30	5,514.58	18.70	517.35
2007	388.13	3,299.54	6.34	4,813.49	7,554.98	18.36	-35.37
2008	463.49	3,915.79	7.86	7,799.40	12,275.38	18.70	-764.71
2009	2,922.80	4,428.56	13.04	8,912.14	15,161.00	22.62	1,372.71
2010	1,077.60	5,461.23	13.26	7,706.43	17,033.89	22.51	245.78
2011	360.07	6,298.04	12.11	7,312.73	11,787.21	22.42	234.17
2012	286.09	7,171.39	11.48	8,150.03	18,929.34	23.79	-45.60
2013	324.10	8,009.26	10.25	10,005.59	23,783.76	24.69	-411.37
2014	343.19	8,904.36	8.08	12,889.42	22,165.23	25.74	-791.87
2015	635.99	9,414.50	9.01	13,086.20	34,388.31	26.71	-886.93
2016	2,066.23	10,148.95	15.68	16,117.20	32,622.31	27.29	52.68
2017	2,331.18	11,371.16	16.52	15,740.59	40,061.11	30.68	548.84
2018	1,766.16	12,773.68	12.09	15,134.20	40,835.35	30.52	737.47
2019	1,036.42	14,421.05	11.40	17,187.77	51,654.06	30.72	-340.78

Source: CBN Statistical Bulletin (2019) and CBN Bank Review (Various); Author's Compilation (2020)

## 2. Regression Output (From Eviews10)

### 2.1. OLS Result

Dependent Variable: NPL				
Method: Least Squares				
Date: 07/20/20 Time: 00:03				
Sample (adjusted): 1994 2019				
Included observations: 26 after adjustments				
Variable	Coefficient	Std Error	t-Statistic	Prob.
C	-327.1490464	876.1889289	-0.3733773	0.71279599
GDP	-0.4347221	0.1658298	-2.6214950	0.01634791
INFR	-0.3163466	7.5522237	-0.0418879	0.96700344
TLADV	0.2881183	0.0868743	3.3164948	0.00344347
TA	0.0432170	0.0410004	1.0540613	0.30442305
BLR	25.8003121	39.0572712	0.6605764	0.51642112
R-squared	0.6375718	Mean dependent var		608.8673
Adjusted R-squared	0.5469648	S.D. dependent var		791.0101
S.E. of Regression	532.41217	Akaike info criterion		407.2105
Sum square resid	5669254.38	Schwarz criterion		410.5010
Log likelihood	-197.105268	Hannan-Quinn criterion		394.2105
F-statistic	7.0366702	Durbin- Watson stat		1.724209
Prob(F-statistic)	0.0006095			

### UNIT ROOT TEST RESULTS 2.2 Non- Performing Loan (NPL: I(1))

Null Hypothesis: D(NPL) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 4 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.536335	0.598293
Test Critical values		
1% Level	1.683851	
5% Level	1.690924	
10% Level	2.032245	

\*MacKinnon (1996) one-sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 18

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(NPL,2)  
 Method: Least Squares  
 Date: 07/20/20 Time: 00:34  
 Sample (adjusted): 2001 2019  
 Included observations: 18 after adjustments

Variable	Coefficient	Std Error	t-Statistic	Prob.
D(NPL(-1))	0.128998	0.2405169	0.5363352	0.5982935
D(NPL(-1),2)	-0.312081	0.2755527	-1.1325641	0.2778548
D(NPL(-2),2)	-0.398173	0.2860738	-1.3918537	0.1873227
D(NPL(-3),2)	-0.307909	0.2920683	-1.0542370	0.3109748
D(NPL(-4),2)	-0.260466	0.3032437	-0.8589332	0.4059371
C	171.6607	225.5041213	0.7612309	0.4601057
@ TREND (1994)	167.3406	68.5134200	2.4424500	0.0372000
R-squared	0.182671176	Mean dependent var		50.037904
Adjusted R-squared	-0.068814616	S.D. dependent var		876.064038
S.E. of Regression	905.7055841	Akaike info criterion		302.272425
Sum square resid	10663933.87	Schwarz criterion		302.756989
Log likelihood	-145.5977508	Hannan-Quinn criterion		296.976245
F-statistic	0.726367779	Durbin- Watson stat		2.11874504
Prob(F-statistic)	0.589522097			

**2.3 Gross Domestic Product (GDP: I(0))**

Null Hypothesis: GDP has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 4 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	2.270058	0.033855
Test Critical values		
1% Level	1.678660	
5% Level	2.012896	
10% Level	2.021075	

\*MacKinnon (1996) one -sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL,2)

Method: Least Squares

Date: 07/20/20 Time: 00:34

Sample (adjusted): 1999 2019

Included observations: 21 after adjustments

Variable	Coefficient	Std Error	t-Statistic	Prob
GDP( -1)	0.5019411	0.2211138	2.2700577	0.0338549
D(GDP(-1))	0.7641344	0.2395359	3.1900626	0.0056954
D(GDP(-2))	0.2259632	0.3017583	0.7488218	0.4648315
D(GDP(-3))	-0.3418366	0.3099538	-1.1028630	0.2863992
D(GDP(-4))	0.4044742	0.2869863	1.4093850	0.1778614
C	79.292756	93.555103	0.8475514	0.4091878
@ TREND (1994)	-198.82860	89.099990	-2.2315220	0.0497000
R-squared	0.783541760	Mean dependent var		664.864296
Adjusted R-squared	0.729427200	S.D. dependent var		421.687038
S.E. of Regression	219.3473135	Akaike info criterion		291.502986
Sum square resid	769811.9029	Schwarz criterion		293.181076
Log likelihood	-140.5014932	Hannan-Quinn criterion		287.092031
F-statistic	14.47931496	Durbin- Watson stat		1.95781394
Prob(F-statistic)	3.50290E-05			

**2.4 Inflation Rate (INFL: I(0))**

Null Hypothesis: INFR has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-12.447175	0.0000000
Test Critical values		
1% Level	1.6786604	
5% Level	2.0128956	
10% Level	2.0153676	

\*MacKinnon (1996) one -sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL,2)

Method: Least Squares

Date: 07/20/20 Time: 00:34

Sample (adjusted): 1999 2019

Included observations: 21 after adjustments

Variable	Coefficient	Std Error	t-Statistic	Prob
INFR( -1)	-0.7223065	0.0580298	-12.4471748	0.0000000
D(INFR(-1))	-0.2363992	0.2329803	-1.0146749	0.3253600
D(INFR(-2))	-0.1454354	0.2200740	-0.6608476	0.5181130
D(INFR(-3))	0.0447130	0.1174535	0.3806872	0.7084423
D(INFR(-4))	0.0259313	0.0992347	0.2613124	0.7971855
C	0.1873485	1.1316296	0.1655564	0.8705799
@ TREND (1994)	-0.5635940	0.2247680	-2.5074480	0.0310000
R-squared	0.08353507	Mean dependent var		0.15666667
Adjusted R-squared	-0.14558117	S.D. dependent var		4.56955833
S.E. of Regression	4.89088170	Akaike info criterion		131.765067
Sum square resid	382.731581	Schwarz criterion		133.443157
Log likelihood	-60.6325337	Hannan-Quinn criterion		124.309590
F-statistic	0.36459689	Durbin- Watson stat		2.06606950
Prob(F-statistic)	0.83022518			

**2.6 Total Assets (TA: I(1))**

Null Hypothesis: D(TA) has a unit root  
 Exogenous: Constant, Linear Trend  
 Lag Length: 4 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.762549	0.001145
Test Critical values		
1% Level	1.678660	
5% Level	2.012896	
10% Level	2.015368	

\*MacKinnon (1996) one -sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL,2)

Method: Least Squares

Date: 07/20/20 Time: 00:34

Sample (adjusted): 1999 2019

Included observations: 22 after adjustments

Variable	Coefficient	Std Error	t-Statistic	Prob
D(TA(-1))	-0.7435753	0.197625	-3.7625486	0.0011446
D(TA(-1),2)	-0.3832829	0.248468	-1.5425860	0.1403290
D(TA(-2),2)	0.3286195	0.262550	1.2516462	0.2267209
D(TA(-3),2)	0.2940436	0.259477	1.1332154	0.2719928
C	2008.2145334	1243.390940	1.6151111	0.1236787
@ TREND (1994)	676.1219000	190.735200	3.5448190	0.0046000
R-squared	0.879559288	Mean dependent var	2326.51902	
Adjusted R-squared	0.851220297	S.D. dependent var	4280.04548	
S.E. of Regression	3991.666476	Akaike info criterion	430.613049	
Sum square resid	286801222.6	Schwarz criterion	432.552843	
Log likelihood	-211.6398576	Hannan-Quinn criterion	369.459732	
F-statistic	2.047969367	Durbin- Watson stat	1.99431152	
Prob(F-statistic)	1.43143E-01			

**2.7 Bank Lending Rate (BLR: I(0))**

Null Hypothesis: BLR has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 4 (Automatic - based on SIC, maxlag=4)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.168138	0.255842
Test Critical values		
1% Level	1.678660	
5% Level	2.012896	
10% Level	2.015368	

\*MacKinnon (1996) one -sided p-values.

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(NPL,2)

Method: Least Squares

Date: 07/20/20 Time: 00:34

Sample (adjusted): 1999 2019

Included observations: 21 after adjustments

Variable	Coefficient	Std Error	t-Statistic	Prob
BLR(-1)	-0.192506	0.202554	-0.950391	0.352724
C	5.032944	4.741503	1.061466	0.300534
@ TREND (1994)	0.066710	0.112415	0.593427	0.560300
R-squared	0.183928	Mean dependent var	0.413884	
Adjusted R-squared	0.106207	S.D. dependent var	3.247537	
S.E. of Regression	3.070242	Akaike info criterion	123.524786	
Sum square resid	197.954115	Schwarz criterion	125.309465	
Log likelihood	-59.476679	Hannan-Quinn criterion	119.12738	
F-statistic	2.366512	Durbin- Watson stat	2.1245759	
Prob(F-statistic)	0.118345			

## 2.8. Johansen Cointegration Test Result for the Three I (1) Series

Date: 07/20/20 Time: 11:28  
 Sample (adjusted): 1995 2019  
 Included observations: 24 after adjustments  
 Trend assumption: Linear deterministic trend  
 Series: NPL TLADV TA  
 Lags interval (in first differences): 1 to 1

### Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.766806	51.377944	24.274725	< 0.0001
At most 1	0.521633	17.892648	12.320558	0.005290
At most 2	0.039752	0.932958	4.130193	0.386917

### Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.766806	33.485296	17.796562	< 0.0001
At most 1	0.521633	16.959690	11.225221	0.004464
At most 2	0.039752	0.932958	4.130193	0.386917

### Unrestricted Cointegrating Coefficients (normalized by $b^*S^{-1}b=l$ ):

	NPL	TLADV	TA
	0.002792	-0.0001718	-0.000099
	-0.000797	0.0014660	-0.000480
	0.000688	-0.0003765	-0.000300

### Unrestricted Adjustment Coefficients (alpha):

D(NPL)	-575.712700	194.070271	-82.843708
D(TLADV)	-867.231827	-606.544421	62.193932
D(TA)	-1133.498819	1562.017372	599.333861