Effects of Macroeconomic Indices on Non-Performing Loans in Nigeria Banks

Abstract: This study examines the effects of macroeconomic indices on non-performing loans in Commercial banks in Nigeria using time series data during 1992-2019. Analysis was done using OLS, Johansen Co-integration Test and Vector Error Correction Model. Non-performing loan is the dependent variable while inflation, real exchange rate, lending rate and real gross domestic product (RGDP) growth are the explanatory variables. Our long run analyses show that lending rate and inflation have positive relationship with the dependent variable (NPL) while the RGDP shows significant negative relationship with NPL. Meanwhile, all other variables have non-significant positive relationship with non-performing loans in Commercial Banks in Nigeria at the short run. The study recommends that the monetary authorities should be more flexible and deliberate in setting business friendly Monetary Policy Rate (MPR) which invariably regulates the lending rate, this is because lending rate is a core part of bank’s cost profile and efficiency is critical to their performances. Stabilizing lending rate is achievable when investors buoy up savings (cheap funds) to dilute cost of fund and borrowing for investment purposes.

Keywords: Macroeconomic indices, Lending rate, Inflation, Real exchange rate.

INTRODUCTION

The banking sector plays vital roles in economic development both in all classes of economy because of the salient position it occupies in the mobilisation of savings and distribution of credit. Commercial banks have provision and extension of credit facilities (loans and advances) to credit worthy customers who are also perceived to be having the capacity and wherewithal to meet repayment obligations.

Bank loans are regarded as risk assets because the monies advanced as loans by the banks belong to depositors and it is the major source of bank earnings through net interest income (Asekome and Agbonkhese, 2014). It is also through the process of lending that banks provide productive investments which invariably contribute to the growth and development of the economy and the promotion of the welfare of the people (Unugbro, 2007). However, in the process of extending these credit facilities to customers, banks are exposed to various risks chief among which is the credit risk expressed as loss resulting from failure of borrowers to repay a loan or meet contractual obligation and making it difficult for depositors’ monies to be available as and when such is demanded.

Non-performing loans are those that borrowers fail to repay according to earlier agreed schedule of payment of interest and principal for at least 90 days issued prudential guidelines to licensed banks and recommended their classification into three categories which are sub-standard, doubtful and lost (Unugbro, 2007). The increase in the level of non-performing loans in the banking sectors becomes a serious threat to banks’ existence due to its drastic effects on bank profitability, capital erosion and impairment of liquidity, poor asset quality, loss of public confidence and bank failure (Augbovo and Igbinosa, 2014).

In Nigeria, increase in non-performing is one of the most crucial liquidity challenges facing the Commercial Banks. The proportion of non-performing loans to total loans and advances in the banking system was believed to be the major cause of financial crisis in the 1990s and 2000s which were experienced both in developing and developed countries (Badar and Javid, 2013). For example, in Nigeria, the total loans granted by banks increased by 736.8 percent from ₦1.9 trillion in 2005 to ₦15.9 trillion in 2019. However, the banking industry witnessed a significant downturn in the quality of its assets as non-performing loans rose remarkably by 99.1 percent from ₦368.76 billion as at end December 2005 to ₦3.2 trillion as at end December 2013 but later the value of non-performing loan declined to ₦1.1 trillion by December 2019. Consequently, the ratio of non-performing loans to total loans of the banks increased to 7.92 per cent in 2006 to 14.84 per cent in 2017 and later decline to 6.03 percent in 2019.
This decline could be attributed to increase in loan recoveries and loan write-offs and the decision of banks to diversify their loan portfolio into other variable sectors such as manufacturing and export (Achara, 2019). According to the report from National Bureau of statistics (NBS), non-performing loans in Nigeria dropped to a 4-year low of ₦1.44 trillion in Q2 2019 from ₦1.93 trillion. This suggests that in one year, banks recovered ₦96.22 billion non-performing loans (Bamidele, 2019). We expect the level of non-performing loan to increase after covid-19 because most economic activities were negatively affected and grounded due to the initial lockdown, this reduced the capacity of organisations to meet up with their loan obligations with many of them already requesting for restructuring of their credit facilities.

Identifying the macroeconomic indices that influence non-performing loans is necessary for developing economy like Nigeria, as the higher the risk coefficient associated with macroeconomic factors such as inflation, exchange rate and lending rate, among others, the lower the bank positive disposition to perform restructuring of their credit facilities. The provision of CBN's has recommended the classifications of non-performing loans as sub-standard, doubtful and lost.

Unugbro on his part list implications of non-performing loans on financial institution to include among other things, evocation of negative public image which cast doubts on the collective integrity of the management team and limitation in availability of loanable fund.

The quantum of non-performing loans in Nigeria has been a major source of concerned as it threatens the country’s financial sector. This has culminated in the signing into law the Amendment Act, 2019 of Asset Management Corporation of Nigeria (AMCON) on 7th August, 2019. The new law grants the Corporation more power to enforce recovery of debt from prominent Nigerians and corporations such as the power to place any bank account or any other account related to a bank account of a debtor of an eligible financial institution under surveillance (Bamidele, 2019). The current report of National bureau of statistic 2019 shows that total gross loans in Nigeria banks stood at ₦15.9trillion as at the end of December 2019 and non-performing loans to the total loans ratio declined to 6.03 percent. This reduction in non-performing can be attributed to the recent directive given by Central Bank of Nigeria to Commercial banks for the immediate suspension of interests on non-performing loans to oil markets as the failure of Federal Government to pay fuel subsidy to oil marketers has worsened their situation which in turn increase non-performing loans.

The rest of the study is organised as follows. Section 2 reviewed conceptual frameworks, theoretical and empirical literatures; Section 3 the methodology of the study; Section 4 analysis, result presentation and interpretation. Section 5 conclusion and recommendation.
law and every other measure put in place by the Central Bank (Bamidele, 2019).

**Concept of Macroeconomics**

These are events that affects the course or direction of a given large scale economy. The macro environment typically affects balance sheets of business agents, the capacity to honour debt obligations. Hence, proxies for the macroeconomic environment tend to have some form of relationship with non-performing loans (Kure, Adigun and Okedigba, 2017). Macroeconomic factor can be positive, negative or neutral. Positive macroeconomic factor comprise of events that ultimately stimulate economic stability and expansion within a country. Some positive factors can lead to reduction in the volume of non-performing loans while some can lead to increase in the volume of non-performing loan. Negative macroeconomic factors comprise of events that threaten the national or global economy while neutral macroeconomic factors are some economic changes that are neither positive nor negative. Macroeconomic factors include inflation, gross domestic product, exchange rate, price level, unemployment, interest rate, national income and so on. This paper makes use of inflation, real exchange rate, lending rate and real gross domestic product (RGDP) growth as our macroeconomic factors.

**Concept of Gross Domestic Product (RGDP) growth**

This is the total monetary or market value of all the final goods and services produced within a country in a given period of time. It is a sophisticated measure of the value of economic activity. Real Gross Domestic Product is the production of goods and services valued at constant prices. High GDP growth implies that the economy is performing well, and incomes of its citizens are increasing. Growing revenues demonstrate that loans will be paid. Annual GDP growth will unreservedly assure that bank lending would function effectively (Anjom and Karim, 2015). In Nigeria the real gross domestic product has improved from ₦46, 012.52billion in 2008 to ₦759, 929billion by December 2012. It also increase from ₦63, 219.72billion in 2013 to ₦71, 387.83 by December 2019 reflecting economic growth (CBN, Bulletin 2019).

**Concept of Inflation**

Inflation refers to general rise in the level of prices for goods and services with a consequence of marked drop in the purchasing power of currency. Inflation can have a positive or negative effect on the economy; the effect of inflation on NPLs may either be positive or negative.

Higher inflation reduces borrowers’ repayment capacity and raises NPLs, whereas real value of debt service tends to decline with higher inflation, thereby driving down NPLs (Klein, 2013). The aim of monetary authority is to tame inflation by reducing it to a single digit with monetary tightening since 2011, after a steady decline in inflation to 8.48% in December 2013; it increases to 11.4% in December 2019 and it has been over 13% in 2020. This level of increase usually affects the borrower ability to repay their debt as high inflation rate decreases the overall operating efficiency of the firms and the economy resulting to increase in the growth of non-performing loans in Commercial banks.

**Concept of Exchange rate**

Exchange Rate is the price or measure of a nation’s currency in term of other currencies. Real exchange rate compares a nation’s currency value against the weighted average of a basket of major currencies. Currency depreciation may have a negative or a positive effect on non-performing loans (NPLs). Currency depreciation in a country with flexible exchange rate regimes and a large amount of lending in foreign currency, may have a positive effect on accumulation of NPLs (Fofack, 2005). The rate of exchange is increasing tremendously from ₦169.69 to $1 by December 2014, to ₦306.95 to $1 by December 2019 and now ₦379 to $1 as at November 3, 2020. This increase adversely affects the economy as Nigeria as a net importer. This negative effect leads to increase in loan default and non-performing loans in the banking industry.

**Concept of lending rate**

Lending rate is the cost attached to the principal by a lender to a borrower for the use of assets. Our finding reveal that high lending high lending rate leads to an increase in non-performing loan as borrowers often find it difficult to repay their loan. Nigeria Banks increases their maximum lending rate from 15% to 20% and above (note, this is exclusive of other flat charges) and this high rate mostly affects the borrower’s ability to repay their debt, which in turn lead to increase in non-performing loans.

**THEORETICAL FRAMEWORK**

**Information Asymmetric and Moral Hazard Theory**

Information asymmetry theory was first applied by Akerlof (1970). It states that bank may find it difficult to decipher between good and bad borrowers because some borrower may falsify their account in order to obtain credit facility from bank and this action lead to adverse selection and moral hazard problems. Moral hazards on the other hand occur when a banks customer provides details that is misleading about its financial statements or his or her credit capacity, or has a hidden incentive to take risks that are unusual in an attempt to earn a profit. A prospective borrower may not enter into the contract with the bank in good faith, thereby given misleading information about his or financial status or credit capacity. Moral hazard may result to information asymmetry between banks customer and the bank which makes it hard to distinguish between credit worthy customer and non-
credit worthy customer (Richard (2011), this has also led to accumulation of non-performing loans (Bofonandi & Gobbi, 2003). The theory is important to this study due to the fact that effective and efficient financial systems and financial intermediation requires accurate information about borrowers and the venture the credit are used for. More so, the moral hazard theory stated that the higher the nonperforming loan’s the lower the financial performance and the higher the assets quality the higher the financial performance of banks and vice versa (Okoh, Inim, and Idachaba, 2019).

The Adverse Selection Theory

This theory was propounded by Akerlof (1970) and later expanded by Rothschild and Stiglitz (1976), it describes a situation where the probability of loan default increases with rising interest rate and the quality of borrowers worsens as the cost of borrowing rises (Musara and Olawale, 2012). The theory is founded on the assumption that banks are not certain in selecting credit-worthy borrowers from a pool of loan seekers with different credit risk exposures ex-ante. Thus, financial intermediaries are more likely to lend to high-risk borrowers who are not concerned about the harsh lending conditions and are prone to loan default (Ezeoha, 2011).

Empirical Review

Okoh, Inim and Idachaba (2019) investigate the effects of non-performing loans on the financial performance of Commercial banks in Nigeria; using multiple regression techniques to analyse data from 1985 - 2016. The study shows that Non-Performing Loans to Total Loans ratio and Cash Reserve Ratio had statistically negative significant effect on Return on Asset (ROA). These result shows that a high level of non-performing loans would reduce the financial performance of commercial banks in Nigeria.

In his study, Atoi (2018) applied restricted dynamic GMM and a panel vector autoregressive framework to estimate the macroeconomic and bank specific drivers of non-performing for licensed and International banks in Nigeria from quarter 2, 2014 to quarter 2, 2017. His findings reveal that NPLs drivers vary across the two categories of banks, but weighted average lending rate is a vital drivers of NPLs on both banks. Mazreku, Morina, Sinteri and Grima (2018) examine the determinants of the level of non-performing loans in Commercial Banks of transition countries. The study employed Pooled OLS, fixed and random effect estimation as well as complex dynamic panel data method for autoregressive lagged and the result shows that GDP growth and inflation are both negatively and significantly correlated with the level of non-performing loans while unemployment is positively related to non-performing loans.

Koju, Koju and Wang (2017) evaluate the macroeconomic and bank specific determinants of non-performing loans (NPL) in the Nepalese banking system using both static and dynamic panel estimation approaches. The findings show that NPLs have significant positive relationship with the export to import ratio, inefficiency, and assets size and a negative relationship with the GDP growth rate, capital adequacy, and inflation rate. The results of the empirical study indicate low economic growth as the primary cause of high NPLs in Nepal and suggest that efficient management and effective financial policies are required for a stable financial system and economy.

Kure, Adigun and Okadigba (2017) examine the determinants of non-performing loans and its feedback on the macro economy. The study employed the Pool Mean Group (PMG) estimator and a Panel Vector Autoregressive (PVAR) Lag method to analyse quarterly data spanning 2007-2016. The result revealed a negative relationship between economic growth and non-performing loans, suggesting that improvement in the production environment can lower the growth of non-performing loans. The study further ascertains moderate impact of NPLs on the economy: decline in credit and bank assets, increase in risk taking by banks and reduction in economic growth.

Umoren, Nwosu, Udoh and Apan (2016) investigate the relationship between nonperforming loans and Manufacturing sub-sector productivity in Nigeria, time series data from 1980-2016 were analysed using exponential trend, Granger causality test, and simple regression model. Descriptive and inferential analyses revealed that, NPLs exhibited a negative exponential growth rate of -5.89%; while manufacturing sub-sector productivity declined at the rate of 6.60% during the study period. The result of the analysis indicated an inverse significant relationship between NPLs and Manufacturing sub-sector productivity in Nigeria. The study by Morakinyo and Sibanda (2016) investigate the dynamics of non-performing loans and economic growth in Nigeria using Autoregressive distributed lag model using quarterly data spanning 1998 to 2014. To analyse endogenous growth model and found that NPLs level and bank credits to the economy has a negative but significant impact on economic growth. The study also applied an error correction mechanism to establish a slow response to equilibrium in the next period, once the system was distorted. Also, Idewele (2016) examines the determinants of non-performing loans in Nigeria using ordinary least square multiple regression to analyse time series from 1981-2014. The study revealed that gross domestic product is not a significant determinant of bad debt ratio and poor credit management contributed significantly to nonperforming loans in Nigerian banks. Ugoani (2015) evaluate the effects of nonperforming loans on Bank profitability in Nigeria using descriptive and regression statistical method. The result confirm that nonperforming loans has a negative influence on bank profitability.
Aigbovo and Iginosa (2014) examine the determinants of macroeconomic drivers of nonperforming loans in the Nigeria banking sector. The study employs Engle and Granger, two stage Co-integration estimation techniques and the associated Error Correction Mechanism to estimate the multivariate model with time series data from 1980-2012. The result of the study revealed that economic variables has not adequately impacted on non-performing loans of banks in Nigeria due to the level of economic and financial development in the country and complexity in implementing banking reforms that hinders these reforms from achieving the desired results. Akinlo and Mogoluwase (2014) evaluated the determinant of non-performing loans in Nigeria using descriptive statistic, Augmented Dickey-Fuller (ADF) unit root test, Johansen Co-integration and Error correction model with data spanning 1981-2011. The result shows that increase in real GDP tend to reduce non-performing loans both in the short run and long run, exchange rate and credit to private sector tend to increase NPLs, lending rate has increasing effects on NPLs and stock market index has a negative effect on NPLs. Asekome and Agbonkhese (2014) employed econometric technique of Ordinary Least Square to determine the effects of macroeconomic indicators on risk assets creation in Nigeria. The result revealed that all the variable were in tandem with the theoretical expectation except gross domestic product and considering the t-value, all the variables were statically significant as well except capacity utilization of industries. Also, Chude and Chude (2014) examine implication of non-performing loans on Economic growth in Nigeria. The study was analysed using OLS, Augmented Dickey-Fuller unit root test and Johansen Co-integration method on time series time spanning 1992-2009, the result shows that there is a long run relationship between NPLs and economic growth and also a significant relationship between inflation rate and NPLs.

In an International Monetary Fund Working Paper, Klein (2013) investigates the non-performing loans (NPLs) in Central, Eastern and South-Eastern Europe (CESEE) covering 1998–2011. The study reveals that the NPLs level can be ascribed to both macroeconomic conditions and banks’ specific factors, even though the banks’ specific factors was found to have a relatively low explanatory effect on NPLs. It further reveal that NPLs were found to respond to macroeconomic conditions, such as GDP growth, unemployment, and inflation which means it affects the economic recovery of the region.

Mohammad, Ammara, Abrar and Fareeha (2012) examined economic determinants of non-performing loans using correlation and regression analysis to analyse the impact of selected independent variables and the result reveals that interest rate, energy crisis, unemployment, inflation and exchange rate has a significant positive relationship with the non-performing loans of Pakistan banking sector, while GDP growth rate has a significant negative relationship with the non-performing loans of Pakistan banking sector.

Khemraj and Pasha (2009) tested empirically a fixed-effect panel data model for the determinants of non-performing loans in the Guyanese banking sector. The study found standard macroeconomic and bank specific factors to be relevant in the evolution of non-performing loans. Among the macroeconomic variables considered were annual inflation rate, real effective exchange rate and GDP growth rate. The authors also found banks, with relatively higher interest rates and excessive lending, incur higher levels of nonperforming loans.

**Methodology**

The study investigate the effect of macroeconomic indices on non-performing loans in commercial banks in Nigeria using annual time series data from 1992 to 2019 obtained from the Central Bank of Nigeria (CBN) statistical bulletin and National Bureau of Statistics (NBS) reports. The model was estimated by employing the econometric techniques of Ordinary Least Square Method (OLS), Augmented Dickey-Fuller (ADF) unit root test, Johansen co-integration test and Vector Error Correction Mechanism (VECM). Unit root test was carried out using the Augmented Dickey-Fuller (ADF) in order to determine the stationarity of variables. Ordinary Least Squares method is adopted to investigate the long run relationship between variables. The Vector Error Correction Model is also adopted to examine the speed of adjustment, that is, the rate at which the dependent variable adjust to changes in the independent variables in the long run. The Johansen co-integration test is used to test co-integration and convergence between the variables.

**Model Specification**

The model is based on the modification of the empirical models of Aigbovo and Iiginosa (2014). The model specifies the dependent variable Non performing loan is a measure of loan loss provision to total loan ratio (LPTLR) as a function of lending rate, inflation rate, real effective exchange rate and real GDP growth representing the independent variables. The model is specified as follows:

\[ NPL = \beta_0 + \beta_1 LR + \beta_2 INF + \beta_3 REXR + \beta_4 RGDPG + \epsilon \] \hspace{1cm} (1)

The econometric form of equation (1) is represented as:

\[ NPL = \beta_0 + \beta_1 LR + \beta_2 INF + \beta_3 REXR + \beta_4 RGDPG + \epsilon \] \hspace{1cm} (2)

Where:

\[ NPL \rightarrow \text{Non performing loan is a measure of total loan loss provision to total loan ratio (LPTLR)} \]
In order to avoid the occurrence of spurious regression parameter, the Augmented Dickey Fuller test was employed to test the presence or otherwise of unit root in the series.

Therefore, the study rejects the null hypothesis of presence of unit root and accepts the alternative hypothesis that there is no unit root in the data series.

Seeing that the variables have different order of integration from the unit root result above, the method of co-integration would no longer be Augmented Engle Granger co-integration method. Rather, the study will adopt Johansen multivariate co-integration investigating method which is a system equation.

According to the rule, all that is required to ensure co-integration is at least one co-integration equation.

For the purposes of reasonable policy making, the relationship between non-performing loan and macroeconomic indices variables in the long run is very important. If variables have a causal relationship that allows them to move in perfect harmony in the long run, the confidence level of the consistency of the formulated policy will be robust. It was against this backdrop that the co-integration test was conducted, so as to determine if there is a co-integration among the variables. From the test statistic of trace and maximum-eigen values below, result shows that there is two and two co-integrating equation among the variables. This, therefore, gives the basis to reject the null hypothesis of no co-integration among variables at 5% level. This confirms the existence of long run relationship between

Table 1. Unit Root Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF Test @ LEVEL</th>
<th>Critical values @ 5%</th>
<th>ADF Test @ Difference</th>
<th>Critical values @ 5%</th>
<th>ADF Test Second Difference</th>
<th>Critical values @ 5%</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPL</td>
<td>-3.362899</td>
<td>-3.56068</td>
<td>-4.827006</td>
<td>-3.595026</td>
<td>-</td>
<td>-1(1)</td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>-2.043160</td>
<td>-3.987527</td>
<td>-3.951301</td>
<td>-3.603202</td>
<td>-</td>
<td>-1(1)</td>
<td></td>
</tr>
<tr>
<td>LR</td>
<td>-6.648284</td>
<td>-3.987527</td>
<td>-4.771311</td>
<td>-3.595026</td>
<td>-</td>
<td>-1(0)</td>
<td></td>
</tr>
<tr>
<td>REXR</td>
<td>-2.635033</td>
<td>-3.987527</td>
<td>-4.771311</td>
<td>-3.595026</td>
<td>-</td>
<td>-1(1)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ computation (2020)

Table 2. Johansen Multivariate Co-integration Test result

<table>
<thead>
<tr>
<th>Hypothesized of CE(s)</th>
<th>No</th>
<th>TRACE STATISTIC</th>
<th>Critical Value @ 5%</th>
<th>MAX-EIGEN STATISTIC</th>
<th>Critical Value @ 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>r = 0*</td>
<td>127,7338</td>
<td>69.81189</td>
<td>61.04545</td>
<td>33.87687</td>
<td></td>
</tr>
<tr>
<td>r ≤ 1*</td>
<td>66.68834</td>
<td>47.85613</td>
<td>40.62378</td>
<td>27.58434</td>
<td></td>
</tr>
<tr>
<td>r ≤ 3*</td>
<td>11.95238</td>
<td>15.49471</td>
<td>10.26998</td>
<td>14.26460</td>
<td></td>
</tr>
<tr>
<td>r ≤ 4</td>
<td>1.682397</td>
<td>3.841466</td>
<td>1.682397</td>
<td>3.841466</td>
<td></td>
</tr>
</tbody>
</table>

(*) denotes rejection of the hypothesis at 5%

Source: Authors’ computation (2020)
non-performing loans and macroeconomic variables in Nigeria.

Table 3. Ordinary Least Square Regression

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>t-Statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.876228</td>
<td>8.772783</td>
<td>-0.327858</td>
<td>0.7460</td>
</tr>
<tr>
<td>INF</td>
<td>0.128353</td>
<td>0.055142</td>
<td>2.327686</td>
<td>0.0291</td>
</tr>
<tr>
<td>LR</td>
<td>1.337969</td>
<td>0.344959</td>
<td>3.878636</td>
<td>0.0008</td>
</tr>
<tr>
<td>REXR</td>
<td>-0.006860</td>
<td>0.017647</td>
<td>-0.388755</td>
<td>0.7010</td>
</tr>
<tr>
<td>RGDP</td>
<td>-0.000191</td>
<td>5.43E-05</td>
<td>-3.511259</td>
<td>0.0019</td>
</tr>
</tbody>
</table>

R-squared: 0.820625
Adjusted R-squared: 0.789429
F-statistic: 26.30574
Prob (F-statistic): 0.000000
Durbin Watson: 1.110632

Source: Authors’ computation (2020)

The result presented above revealed that not all the variables satisfy the *a-priori* expectation with respect to their sign. The result above reveals that the coefficient of RGDP growth has a negative and significant effect on non-performing loans which implies that a unit increase in growth of real gross domestic product will lead to a decrease non-performing loans by 0.000191.

Similarly, the coefficient of REXR exerts a negative and insignificant effect on NPLs which implies that a unit increase in REXR will lead to a decrease in NPLs in Nigeria. Meanwhile, the coefficient of inflation and lending rate are positive and statistically significant at one percent which implies that a unit increase in inflation and lending rate will lead to an increase in NPLs by 0.128353 and 1.337969 percent respectively.

The coefficient of determination is approximately 82% which implies that 82% systematic variations in NPL are attributed to the explanatory variables in the model while the remaining 18% is due to Gaussian White noise. When this adjusted to its degree of freedom, it becomes 80%. The F-statistic was 26.30574 and it is statistically significant one percent. This shows that there is a simultaneous relationship between non-performing loan and macroeconomic variables in Nigeria.

Since the order of integration is not the same, it means that the study is not permitted to adopt a linear equation modelling such as ECM, because literature says for ECM to be adopted, series must be integrated of the same order. Now that they are integrated of different order, it means that the only way forward is to adopt a system equation method. The study, therefore decides to adopt VECM since it is theoretically justified. The result is presented below in table 3 and the model of interest is model 1, which is the model that carries the dependent variable D(NPL). The Vector Error Correction Model was estimated to analyse the systematic disequilibrium adjustment process and the short run effect among the variables.

Table 4. Vector Error Correction Model

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>Standard Error</th>
<th>t-Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>CointEq1ECM</td>
<td>-0.025149</td>
<td>0.10983</td>
<td>-0.22899</td>
</tr>
<tr>
<td>D(NPL(-1))</td>
<td>0.138154</td>
<td>0.26382</td>
<td>0.52366</td>
</tr>
<tr>
<td>D(INF(-1))</td>
<td>0.165293</td>
<td>0.11738</td>
<td>-1.40818</td>
</tr>
<tr>
<td>D(LR(-1))</td>
<td>0.150710</td>
<td>0.50761</td>
<td>0.29690</td>
</tr>
<tr>
<td>D(REXR(-1))</td>
<td>0.016061</td>
<td>0.02404</td>
<td>0.66817</td>
</tr>
<tr>
<td>D(RGDP(-1))</td>
<td>0.000378</td>
<td>0.00079</td>
<td>0.47959</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.212505</td>
<td>1.68842</td>
<td>-0.12586</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.588438</td>
<td>1.689723</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.240193</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>1.689723</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ computation (2020)
The CointEq1ECM results above shows that the coefficient of the vector error correction term satisfies a-priori expectation. This means that it will be effective to correct any deviations from the long-run and short run dynamics. All the variables are positively sign and conform to the a priori expectation of the theory but not statistically significant. The coefficient of CointEq1ECM is -0.025149, indicating that, the speed of adjustment to long run equilibrium is 2.51% when any past deviation will be corrected in the present period. This implies that the present value of NPLs adjust slowly to changes in independent variables. This reveals that the CointEq1 (ECM) has an effective correcting property as the short run and the long run dynamic will be corrected in the long run. The model of interest is the NPLs and it implies that a unit change in past period in NPLs with a coefficient of 0.138154 will cause the current NPLs to increase by 0.138154 units, thou positive but not statistically significant. The result reveals that the coefficient of Inflation is positively related to NPL, this implies that a unit increase in one period past in inflation (\(-1\)) with a coefficient 0.165293 will lead to an increase in NPLs by 0.165293 units in the current year. Lending rate is positively related to NPLs, its coefficient of 0.150710 implies that a unit increase in LR (\(-1\)) will lead to an increase in NPLs by 0.150710 units in the current year. Real exchange rate and real gross domestic product growth are positively related to non-performing loan which implies that a unit increase in one period past in REXRt(-1)) and RGDP (\(-1\)) with coefficient of 0.016061 and 0.000378 will cause NPLs to increase by 0.016061, 0.000378 units respectively in the current year. The coefficient of determination (R\(^2\)) is approximately 59% which implies that approximately 59% systematic variations in NPLs are attributed to the explanatory variable in the model while the remaining 41% is attributed to internal factors in the banks. The F- statistic was 1.689723. This confirms that the model is of good fit to investigate the effect of macroeconomic indices on non-performing loans in Nigeria. From the result, also, it could be seen that the intercept (Constant) has a negative coefficient value of 0.212505.

This shows that even if all the explanatory variables in the model were held constant or equal to zero, NPLs will be reduced by 0.212505 units. This result of this study revealed that macroeconomic indices impacted positively but not significantly on non-performing loans in Commercial banks in Nigeria.

**CONCLUSION**

The study concludes that lending rate and inflation are the vital macroeconomic indices that influence non-performing loans in Commercial banks in Nigeria in the long run, the real gross domestic product also has significant negative effect on non-performing loan in the long run. Meanwhile, all the macroeconomics variables have non-significant positive relationship with non-performing loans in Commercial Banks in Nigeria at the short run. This implies that inflation, macroeconomics indices have impacted positively on non-performing loans in Commercial banks in Nigeria. Therefore the study recommends that:

- The monetary authorities should be more flexible and deliberate in setting business friendly Monetary Policy Rate (MPR) which invariably regulates the lending rate, this is because lending rate is a core part of bank’s cost profile and efficiency is critical to their performances. Stabilizing lending rate is achievable when investors buoy up savings (cheap funds) to dilute cost of fund and borrowing for investment purposes.
- Also, the monetary authority should be more determined to tame the consumer price index (CPI) that is inflation; high rate undermines borrowers’ performance on their loans and could stifle their purchasing power. This is achievable via stabilizing exchange rate and money supply.
- The government should review on more regular basis policies that stimulate economic and financial stability in the economy.
- A corollary of above point is for the Central Bank of Nigeria (CBN) to regularly make policies that would further stabilize the banking sector; this in effect will reduce the impact of non-performing loans on the bank’s bottom line. Applicable measures include strengthening the banks’ internal risk management process of identification, measurement and risk monitoring.

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