

## **The Impact of Non-performing Loans on Nigerian Economic Growth, 2011-2020**

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### **Abstract**

This paper examined the impact of rising non-performing loans (NPL) on Nigeria's economic growth using time series data from 2011 – to 2020. In analyzing this relationship, the co-integrated autoregressive distributed lag (ARDL) model was employed, and the study revealed a long-run negative relationship between NPL and economic growth. This suggests that a higher NPL may have reduced the banks' loan disbursement capacity or made the banks reluctant to give out more loans to the productive sector, adversely affecting the economy. This research also supports the long-standing results of a positive relationship between money supply and economic growth. It further revealed a positive relationship between government expenditure and economic growth in Nigeria. Therefore, the study recommended that Nigeria's financial management team activities include a dedicated watch on the rising NPL in the banking industry. Furthermore, monitoring NPL should no longer be viewed as the sole responsibility of the CBN but that of all managers of the Nigerian economy.

**Key words:** Non-performing loan, economic growth, bank's credit to the private sector, money supply, government expenditure.



## 1. Introduction

The discussion on Non-Performing Loans (NPL) is an essential topic among economic policymakers and researchers in recent years due to its critical nature in determining the health of banks, its impact on the financial system and ultimately, it is an attendant systemic risk on the economy as a whole. An unhealthy financial system undermines economic growth due to NPLs and insufficient capital, while a healthy financial system could enhance economic growth (Hondroyannis et al., 2005). Furthermore, developing countries feel the impact of the financial sector performance more than developed countries (Bakar and Sulong, 2018).

Recent studies suggest that the growth of NPLs requires an increase in capital requirements since NPLs would have reduced the capacity of banks to finance new loans (Zeng, (2012), as there is an inverse relationship between NPLs level and economic growth (Morakinyo and Sibandab (2016); Jimenez and Saurina 2005; Pesaran et al. 2006; Quagliariello 2007; Klein 2013). NPLs are thus a recurring feature of economic and banking crises (European Central Bank, 2013).

Over time, there has been a debatable consensus that as the ratio of NPLs increases, there is an increased risk that a bank will fail. Depending on the size of the bank or its linkage with the economy, the impact may be significant on the economy. Conversely, the performance of the banking industry, in general, has been found to impact the performance of the economy significantly. However, scholars differ in their submissions on the level and direction of this impact.

Since the 2008 global financial crisis that led to the collapse of central banks globally, scholars have given more attention to the impact of bad loans on the health of commercial banks and the economy at large. As the levels of NPLs have risen significantly, negatively affecting the liquidity and profitability of credit institutions and, by implication, undermining banking system stability (Nikolopoulos and Tsalas, 2017). This is premised on the observed link between the financial system and the economy. Economies whose banking sector boomed hitherto witnessed a sudden halt in their credit growth due to the financial crisis of 2008 (IMF, 2012).

In Nigeria, the global financial meltdown of 2008 negatively affected most banks' NPL ratio, which led to the formation of the Asset Management Corporation of Nigeria (AMCON) to free the banking industry of the high rate of Non-performing loans. The Corporation was set up to stabilize and re-vitalize the Nigerian economy. It is pertinent to note that the debt crisis due to large NPLs as a percentage of industry loans was 32.8% as of the end of 2009. Towards achieving this vision, the Corporation set out to positively affect the Nigerian economy by recapitalizing banks affected by the credit burden, buying off NPLs from the banks, and injecting some form of liquidity into them to return to their lending capabilities. From the preceding, it is evident that the Nigerian economic policy stakeholders identified the importance of the effective handling of NPLs vis-à-vis the economy. If the situation is left to escalate, it may portend grave danger for the financial systems' stability and the economy in general.

Based on this insight, the main objective of this study is to investigate the reaction of the Nigerian economy to the changes in the ratio of NPLs.

The present paper is organized as follows. The following section provides a literature review within the theoretical and empirical research studies on the relationship between non-performing loans and economic growth. Section 2 presents a general overview of the methodology and the obtained data. Section 3 gives the results of the study case. Finally, the paper ends with the conclusions in Section 4.

## 2. Literature review

### 2.1. Theoretical review

Internationally, nonperforming loans are considered loans (and other assets) which should be classified as NPL when (1) payments of principal and interest are past due by three months (90 days) or more, or (2) interest payments equal to three months (90 days) interest or more have been capitalised (re-invested into the principal amount), refinanced, or rolled over (i.e. payment has been delayed by arrangement). (IMF, 2006, p. 46). In this line, International Accounting Standards (IASs) prefer to refer to such loans as impaired loans (Baudino, P., Orlandi, J., & Zamil, R. (2018).

Nor and Bahri (2017) explored that capital allocation might be distorted in an economy because of issues in lending as it diminishes the bank's available capital and thus affects the bank's capability to create more loans to the economy within the line of an inverse relationship between NPLs and economic growth.

Klein (2013) posits that the NPL level affects the financial stability of an economy through its impact on a banks' financial intermediation role. Likewise, Lata (2014) stated that a clear symptom of economic slowdown is the accumulation of NPLs. This further supports the bi-directional link between NPLs and the economy, which is broadly grouped by Al-Yousif (2002) and Majid (2007) as (a) finance-led growth; (b) growth-led finance; (c) bi-directional; and (d) the independent.

Balgova et al. (2016) revealed that NPLs is driven by macroeconomic conditions factors that are bank-specific. This supports the earlier study of Espinoza and Prasad (2010), which focused on financial institutions in the Gulf region. Their research chronicled how NPLs increase due to lower economic growth and higher interest rates. Some other studies found a significant relationship between asset quality and the economy. The outcomes of the Nkusu (2011) study demonstrated a significant relationship between asset quality and the economy within 26 advanced economies. Klein (2013) further extended this result for some essential parts of Europe, specifically the central, eastern, and south-eastern regions, concluding that the broader macroeconomic situation and bank-specific factors play crucial roles.

Another stream of studies deals with the interlink between finance and economic growth. This was noted in the earlier work of Ndikumana (2001), where it observed that research attention has increased from both academia and policymakers on the role of the financial system on economic growth or domestic output growth. Some economists have noted a one-directional link, where the activities in the financial system directly affect the economy. Still, some have preferred to see a multidirectional link where the financial system influences and is influenced by the economy. Puatwoe and Piabuo (2017) observed in their study of Cameroon's financial sector development and economic growth that all the financial development indicators reveal a positive impact on economic growth in the long run.

Greenwood and Jovanovic (1990) championed the development of an endogenous growth model that incorporates both financial linkages and economic growth. Morakinyo and Sibanda (2016) theoretically explored the connection between finance and growth within three main links. The first one occurs via the savings boost that stimulates available funds that can be given out as credit, the second one is through the efficient apportionment of savings which allows for positive results from savings and investment, and the third one is through the growth of the marginal social product of capital. This is in line with Cooray's (2009) conclusions, which concluded that the financial sector's size, activity, and efficiency are crucial for economic growth. As a result, expanding the banking system in the countries under study can boost growth by channelling resources to their most productive uses based on available evidence.

On the other hand, Schumpeter (1969), Hou and Dickinson (2007) concluded that NPLs cause resources to be tied down in unproductive sectors of an economy and, as such, will negatively affect economic growth, which will inversely impact the banking system's ability to lend. This will eventually lead to a dearth of credit to the deficit spending units and cause a situation where financial institutions will reduce the flow of credit below the required average level necessary for specific market conditions (Gertler & Kiyotaki, 2010).

Generally, businesses may find it challenging to survive without the availability of loans, and this has an adverse effect on a country's productive capacity. Hou and Dickinson (2007) noted that the changes in NPLs, among other variables, determine the ability of banks to extend credit to the economy. Impavido, Klingen, & Sun (2012). These authors suggest that the level of NPLs adversely impacts economic growth by impeding credit growth. Balgova et al. (2016) findings on how GDP growth, investment growth, etc. are affected by NPLs are in line with the existing literature; thus, it is suggestive that there is a severe economic gain by reducing the burden of NPLs on the economy. The study's outcomes suggest that increases in economic growth and investment growth are highest when economies manage to escape from the burden of NPLs, especially with the existence of conducive external conditions.

## 2.2. Empirical review

Although the literature is rich in terms of empirical studies on the relationship between non-performing loans and economic growth, the debates concerning this issue are still ongoing. The following are some definitive studies about nonperforming loans and economic growth.

Beck, Jakubik and Piloiu (2013) adopted a dynamic panel estimation by using a generalised method of moments (GMM) to prove that the NPL ratio is explained by GDP more than interest rates or share prices for 75 countries.

A high rate of NPL hinders the bank's capacity to grant further credit. Several businesses depend on bank loans to acquire capital projects or even meet their running costs. Leon and Tracey (2011) estimated the Loan-NPL relationship using a threshold model for a sample of Caribbean countries. The study results suggest that the threshold range for the ratio of NPL/Total Loans determines banks' differential loan behaviour. Accordingly, the Non-Performing Loans ratio increases, banks tend to reduce their lending as they become risk-averse. Therefore NPLs can severely compromise the efficiency of the banking sector". There is further evidence that the rapid increase in NPLs limited the banks' lending capabilities and increased the banks' susceptibility to further shocks. This has broader repercussions for other economic activities proved by employing GMM (Klein, 2013).

Koivu (2002) analyzed the finance-growth nexus using a fixed-effects panel model and unbalanced panel data from 25 transition economies during 1993-2000 and concluded an adverse effect of private credit on the private sector.

Ghali (1999) adopted the Vector autoregression (VAR) to analyze the data on Tunisia (1963-1993), and the results revealed that finance and growth in the country have a strong and positive effect in the long run.

Morakinyo and Sibanda (2016) adopted the endogenous growth model to examine how NPLs and other factors determine economic growth in the long run. The research made use of quarterly data covering the year 1998 to 2014. NPLs was incorporated in a multivariate model by adopting the Auto-regressive Distributive Lag procedure, and the results revealed that NPLs and economic growth have a long-run relationship. The study further found a negative relationship between NPLs and economic growth.

Balgova et al. (2016) collected data on NPL reduction timelines to analyze the burden imposed by NPLs on the economy. They adopted the matching analysis to compare different situations after a rise in NPLs, namely: policy actions to reduce NPL stock, fall in NPL primarily induced by the increase of new credit and cycles of persistent NPLs. The finding revealed that the economy is better off in the medium term by reducing NPLs. This is further bolstered in the work of Balgova et al. (2017), whose research collected NPL data in about 190 countries over a time frame of 27 years. With the use of matching analysis, the result of the study estimated that the reduction in NPL led to extra growth of the economy more than 1.5% per annum over several years.

Nargis et al. (2019) employed multiple regression analysis to analyze the link between NPLs and economic growth using emerging economy data. The research found an insignificant relationship between GDP growth rate and NPLs rate. On the other hand, however, Machacek et al. (2018) earlier conducted a meta-regression analysis and found that real economic growth might significantly influence NPLs. This is in line with the study of Beck et al. (2015), which took macroeconomic sample data across 75 countries and found that NPLs level could be affected by real GDP using the dynamic panel analyses.

### **2.3. Summary of review and gap**

Despite the perceived impact of NPLs on the economy, minimal attention has been given to this direct relationship in scholarly works and research, especially in Nigeria. Morakinyo et al. (2016) confirmed this as they noted that only limited research exists on NPLs as it affects or is affected by economic growth. In their analysis, they used the following variables: NPLs, government expenditure growth rate, gross secondary school enrolment, Bank credit to the economy and the inflation rate in Nigeria to evaluate the determination of economic growth by NPLs and other factors. Perhaps, an inclusion of Money supply and loan interest rate could reveal more causal effects between NPL and economic growth in Nigeria. It should also be noted that some more attention had been given to the impact of NPLs on banks or the role played by the banks and the financial system on the economy but not much has been done on the direct link between NPLs and the economy in the literature, especially using the data obtainable from Nigeria.

## 2.4. Recent measures against NPLs in Nigeria

### *Introduction of the bank verification number (BVN)*

The Central Bank of Nigeria introduced a centralized biometric identification system on 14<sup>th</sup> February 2014. With this system, all registered bank account holders were given a unique personal identification number after their enrolment, and this is referred to as the bank verification number (BVN). It was designed to combat illegal banking transactions as one BVN is assigned to a specific individual across all his accounts in all Nigerian Banks. The extension of the capability of this data bank is the ability to trace all credit defaulters across the banking industry, even when such defaulters decide to use different name sets. This has made the tracking of credit defaulters easier in Nigeria.

### *Offer letter clause for credit facilities*

To tackle the growth of NPLs, the Central Bank of Nigeria issued a letter to all Nigerian banks on 26<sup>th</sup> August 2019, allowing the banks to settle the outstanding indebtedness of credit defaulters with any amount standing in credit in any of their accounts across the banking industry in Nigeria. This resolution was reached at the 345<sup>th</sup> Bankers Committee meeting held on 26<sup>th</sup> August 2019. This is to be achieved by inserting some clauses into the terms and conditions in loan contract documents.

### *Amendments of the AMCON Act (2010)*

Nigeria chose to form the Asset Management Corporation of Nigeria (AMCON) in the year 2010 according to the enabling Act setting up the Corporation to free the Nigerian commercial banks of their bad debts and recover these debts in the interest of the Nigerian economy. Since the inception of the Corporation, its enabling Act has been amended twice. The first amendment got the presidential assent on 26<sup>th</sup> May 2016 and the second amendment got the presidential assent on 29<sup>th</sup> Day of July 2019. These amendments were to further strengthen the Corporation in its debt recovery activities. The Corporation has also been authorized to publish the names of recalcitrant debtors in National newspapers in a name and shame arrangement.

### *Redesigned Credit Risk Management System (CRMS)*

Towards promoting a safe financial system by keeping a robust data bank of all loan borrowers in Commercial, Merchant and Non-interest Banks in Nigeria, the CBN introduced the redesigned CRMS in February 2017. This data bank served as a reference point for all the affected banks to confirm the creditworthiness of intending borrowers. The scope of the CRMS was further enlarged in April 2021 by including all Development Finance Institutions, Microfinance banks, Primary mortgage institutions and Finance companies. This has allowed for a robust database for all participants in loan disbursement functions across the Nigerian Banking industry.

## 3. Data and methodology

### 3.1. Technique of analysis and empirical model

This study will refer to the estimable form of the growth model according to Morakinyo and Sibanda (2016), which is derived as follows:

$$\text{Per capita real GDP Growth rate} = a + b_1b_{tcr} + b_2NPLS + b_3Infr + b_4grenr2 + b_5gengvconexpgr + e \quad (1)$$

Where:

Per capita, real output growth is expressed as a function of

1.  $b_{tcr}$  = Banks credit to the private sector
2.  $NPLs$  = Nonperforming loans,
3.  $Infr$  = Inflation rate,
4.  $grenr2$  = Gross Secondary School Enrollment rate and
5.  $gengvconexpgr$  = general government expenditure.

To enrich the work, we will be adding two extra variables,  $M_3$  and Interest rate, in the model.  $M_3$  is added following Lucas (1996) where he noted in his Nobel lecture that "This tension between two incompatible ideas - that changes in money are neutral unit changes and that they induce movements in employment and production in the same direction- has been at the center of monetary theory at least since Hume wrote". Also, we include Interest rate following the research of Udoka and Anyigang (2012), who noted that the relationship between interest rate and economic growth in Nigeria is negative. GDP will decrease if the interest rate increases, which will ultimately impede the growth of the real sector.

However, we will be leaving out Gross Secondary School Enrollment rate  $grenr2$  as it is assumed to be more useful as a human development index used for measuring economic development and not the essential economic growth measurement. Also, we will assume that inflation has been factored into the estimates of the Real GDP. More so, in place of Per capita real GDP growth rate, we will adopt the Real GDP growth rate.

Thus, the model is specified as

$$RGDPgr = a + b_1B_{tcr} + b_2NPLs + b_3GXP + b_4M_3 + b_5IntR + e \quad (2)$$

Where:

GDPgr = Real GDP Growth rate

Btcr = Bank's credit to the private sector

NPLS = Nonperforming loans

GXP = General government expenditure

$M_3$  =  $M_2$  plus Open Market Operation Bills.

IntR = Real Interest Rate measured using the Maximum lending rate.

e = Stochastic or error term

The model (2) will be estimated using the co-integrated autoregressive distributed lag (ARDL) model. This model will be employed in the study as the equation contains independent variables that can influence the dependent variable. More so, the ARDL model incorporates the lags for both the dependent and independent variables in its estimation. As applicable in other comparable time series regression models, this model expects all the data sets in the study to be stationary though the level relationships can still be estimated even the integrated variables are/ are not co-integrated. This is achievable by evaluating the co-

integrating properties of the variables employing the Bounds Test Approach developed by Pesaran et al. (2001). The approach is based on the order of integration of the variables. Here, if  $K_t$  is the vector of both dependent and independent variables,  $K_t$  must not be integrated of order  $d > 1$ . This brings to the fore the need to verify the unit root properties of the variables to confirm that this precondition is met. This is achieved using the Augmented Dickey-Fuller (1979) technique to test for unit root.

At its level form, the proposed ARDL model in this study is:

$$RGDPG_t = a_0 + \sum_{i=1}^o a_{1i}RGDPG_{t-i} + \sum_{i=0}^p a_{2i}Btcr_{t-i} + \sum_{i=0}^q a_{3i}NPLs_{t-i} + \sum_{i=0}^r a_{4i}GXP_{t-i} + \sum_{i=0}^x a_{5i}M3_{t-i} + \sum_{i=1}^t a_{6i}IntR_{t-i} + e_t \quad (3)$$

Where  $a_1$  to  $a_6$  are coefficients of the level relationships,  $o, p, q, r, x$ , and  $t$  are the optimum lag specifications for RGDPG, Btcr, NPLs, GXP, M3, and IntR, respectively, and these are determined using the akaike information criteria (AIC), and  $e_t$  is the error term.

We can express equation 3 in a co-integrating form to capture the short and long-run dynamics in the relationship between RGDPG and the other variables in the equation.

$$\Delta RGDPG_t = \phi_0 + \sum_{i=1}^c \phi_{1i} \Delta RGDPG_{t-i} + \sum_{i=0}^d \phi_{2i} \Delta Btcr_{t-i} + \sum_{i=0}^f \phi_{3i} \Delta NPLs_{t-i} + \sum_{i=0}^g \phi_{4i} \Delta GXP_{t-i} + \sum_{i=0}^h \phi_{5i} \Delta M3_{t-i} + \sum_{i=1}^j \phi_{6i} \Delta IntR_{t-i} + \delta (RGDPG_{t-1} - c - b_1 Btcr_{t-1} - b_2 NPLs_{t-1} - b_3 GXP_{t-1} - b_4 M3_{t-1} - b_5 IntR_{t-1}) + \varepsilon_t \quad (4)$$

In equation 4,  $\Delta$  means difference operator,  $c, d, f, g, h$ , and  $j$  are the optimum lags for RGDPG, Btcr, NPLs, GXP, M3, and IntR in the short-run, respectively,  $\phi_1$  to  $\phi_6$  represents the short-run coefficients that portray the short-run dynamics in the relationship under investigation, and the coefficients  $b_1$  to  $b_5$  are the long-run coefficients.  $\varepsilon_t$  is the error term in the co-integrating model, the parameter  $\delta$  represents the speed of adjustment, and it measures the speed that the equilibrium is restored in the long run among the co-integrating variables. The research will conduct the bounds test under the null hypothesis of “no level relationship” using the wald test  $b_1 = b_2 = b_3 \dots = b_5 = 0$ .

If the test statistic lies above the upper bound at the selected significance level, the null hypothesis is rejected, but it cannot be rejected if it lies below the lower bound. If it lies between the upper and the lower bound at the selected significance level, the test is said to be inconclusive.

### 3.2. Data and sources

We used quarterly data from 2011 to 2020 to study the impact of non-performing loans on Nigerian economic growth.

The data set included the following variables:

RGDPG (growth rate of the real GDP);

Btcr (growth of total bank’s credit to the private sector);

NPLs (growth of NPLs);



GXP (growth of the total government expenditure);

M3 (growth of broad money supply)

IntR (interest rate measured using the maximum lending rate by commercial banks).

The data statistics were taken from Central Bank of Nigeria (CBN) reports.

The above-mentioned variables were adopted to reflect the significant influencers of non-performing loans in Nigeria. For instance, the credit to the private sector reveals the total loans disbursed by banks to the private sector and a portion of it that has remained unpaid or whose repayment terms have not been met will give rise to the non-performing loans figure. On the other hand, Government Expenditure plays a significant role in loan repayment as experiences in the Asset Management Corporation of Nigeria revealed that many loans depend on the repayment by the government on contracts executed on the government's behalf. The Nigerian government is the highest employer of labour in Nigeria. As such, individual borrowers who are not body corporates depend on salaries received from the government (which form a portion of the recurrent expenditure) to service their loan repayments. This follows the research conducted by Dash and Kabra (2010), which concluded that real income variation and NPL have a negative relationship, but interest rates, NPLs and the real effective exchange rate have a positive relationship.

Similarly, the role of money and interest rates in economic growth has been well documented in earlier researches and how it is available or otherwise directly impact loan repayment capability by borrowers as revealed in the works of Badar and Javid (2013), which showed a bivariate cointegration between NPLs, money supply and interest rates. This followed the work of Sinkey and Greenwalt (1991) and Solarin, Sulaiman and Jauhari (2011), which concluded that there is a positive relationship between interest rate, excessive lending and NPL.

The Btcr, NPL, GXP, M3 and IntR. Data were obtained from the statistics department of the Central Bank of Nigeria, while the GDP data was sourced from the database of the National Bureau of Statistics (NBS).

### **3.3. Apriori expectations**

The Real GDP growth rate is used in this study as it is the most common measure for economic growth. The model used the total bank's credit to the private sector, too, as it forms the basis on which NPLs may occur. Abubakar et al. (2015) noted that private and bank credits stimulate growth in the ECOWAS region through human capital accumulation. Thus, we assume that total bank's credit to the private sector and economic growth have a positive relationship.

Furthermore, without bank credit, there will be no bad loan. Nonperforming loans are central to this research work, and as such, it was considered vis-à-vis the percentage of gross loans. Khemraj and Pasha (2009) studied how NPLs responded to macroeconomic and bank-specific factors in Guyana using regression analysis and concluded that GDP growth is negatively related NPLs. Similarly, Espinoza and Prasad (2010) research corroborated the earlier conclusion that the rise in interest rates coupled with a fall in non-oil economic growth increased the NPL ratio of banks. Thus, in this research, we assume a negative relationship between NPL and economic growth while we also assume the same for the relationship

between Interest rate and economic growth, as shown in the work of Udoka and Anyingang (2012). Considering the role money plays in the economy and several established works in literature, we will assume a positive relationship between money supply and economic growth.

The relationship between government spending and economic growth has shown varied conclusions in economic literature. Diamond and Heller (1989), using the Denison growth accounting approach, concluded that social spending might have a substantial impact on growth in the short run, but infrastructure spending may have little impact. While current spending for directly productive reasons may have a favourable impact, capital expenditure appears to impact these industries negatively. Wu. Et al. (2010) submitted that except for low-income countries, government spending is advantageous to economic growth regardless of how government size and economic growth are assessed. The results confirm the bi-directional causality between government activities and economic growth for various subsamples of nations when the countries are disaggregated by income levels and the degree of corruption. Also, in a similar work conducted in Nigeria by Nurudeen and Usman (2010), they noted a negative relationship between government total expenditure and economic growth. Thus, we will assume either a positive or a negative relationship between government expenditure and economic growth.

Based on the priori expectations, while Btcr and  $M_3$  are expected to impact real GDP growth positively, NPL and IntR are expected to impact real GDP growth negatively. However, the impact of GXP on RGDPG is indeterminate, as it may be positive or negative.

So, hypothesis of the study is the following:

$H_0$ : There is no significant negative relationship between NPLs and Real GDP Growth rate at the 5% significance level.

## 4. Results and interpretations

### 4.1. Unit root test

Table 1 below presents the results of the unit root tests. The variables were integrated of mixed orders,  $i_0$  and  $i_1$ ; thus, the rationale for employing the ARDL is the best estimation technique for the model.

At a 5 per cent level of significance, using the Augmented Dicken Fuller Test, Btcr, NPLs, GXP and  $M_3$  are stationary at level, IntR and RGDPG are non-stationary integrated of order  $d = 1$ . In this case, the null hypothesis of the unit root cannot be outrightly rejected for IntR and RGDPG at 5 per cent level of significance since the variables are first difference stationary. Conversely, Btcr, NPLs, GXP and  $M_3$  are all stationary at a level under the test.

Thus, we may conclude that all the variables are integrated of order  $d < 2$ , supporting their suitability for inclusion in the ARDL test.

**Table 1: Result of the Unit Root Tests**

ADF							
Level		RGDPG	Bter	NPLs	GXP	M3	IntR
	t-Statistic	-2.1496	-6.4548	-4.366	-7.567	-6.7987	-1.7868
	Prob.	0.227	0	0.001	0	0	0.381
At First Difference		d(RGDPG)	d(Bter)	d(NPLs)	d(GXP)	d(M3)	d(IntR)
	t-Statistic	-5.2195	-10.7235	-6.4897	-6.7165	-7.0329	-5.8713
	Prob.	0	0	0	0	0	0

Source: Authors` Estimate

#### 4.2. The ARDL model

This research applied the akaike information criteria (AIC) to estimate the optimum lags for each of the variables in the ARDL model. Thus, the model was specified and estimated at different maximum lags, and under each scenario, the equations were tested for serial correlation, heteroskedasticity and normality in their residual. The study results revealed that the ARDL (1, 1, 0, 2, 0, 2) best describes the relationship between real GDP growth and NPLs in the Nigerian economy.

#### 4.3 The bounds test

Table 2 below shows the results of the bound test, and it did not signify the existence of a long-run relationship among the variables. The null hypothesis of “no level relationship” could not be rejected as the estimated F-statistic = 1.68 was lower than the critical I(0) and I(1) bounds at a 5 per cent level of significance. This suggests that a long-run relationship does not exist among these variables, and as such, the basic ARDL model suffices in the analyses of our estimates.

**Table 2: Result of the ARDL Bound Test**

Test Statistics	Value	Signif.	I(0)	I(1)
Null Hypothesis: No levels relationship				
Asymptotic: n= 1000				
F - Statistic	1.683338	10%	2.08	3
k	5	5%	2.39	3.38
		3%	2.7	3.73
		1%	3.06	4.15
Finite Sample: n = 40				
Actual Sample Size	38	10%	2.306	3.353
		5%	2.734	3.92
		1%	3.657	5.256
Finite Sample: n = 35				
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419

**Source: Authors' Estimate**

#### 4.4. The short-run relationship

From Table 3 below, the results clearly indicate a negative relationship between NPLs and RGDPG in the current period. This is evident in the coefficient of the variable, which is -0.0220. A higher NPL corresponds to a declining GDP in the short term.

Also, there exists a positive relationship between GXP and RGDPG which indicates that as the government pumps more money into the economy through its expenditures, the economy grows. This is in consideration of the computed coefficient of GXP, which stood at 0.0011.

The short-run effects of Btcr and  $M_3$  on RGDPG is positive in current terms but negative in lagged terms. This simply implies that the positive changes in the growth of Btcr and  $M_3$  will cause an increase in economic growth in current terms but a negative growth in lagged terms.

However, this lagged comparison may not be necessary as the results of the bound test already showed that there is no long-run relationship among the variables.

IntR showed a negative relationship with RGDPG in the current period at -0.4209 but a positive relationship of 1.1356 at lag one and again a negative and statistically significant relationship of -0.8396 at lag 2. This further supports the earlier literature that found a negative relationship between interest rate and economic growth.

**Table 3: The Short-Run Estimates**

Short-run: Dependent Variable = D(RGDPG)							
	$\Delta$ RGDPG	$\Delta$ Btcr	$\Delta$ NPLs	$\Delta$ GXP	$\Delta$ M3	IntR	C
Lag 0		0.0150	(0.0220)	0.0011	0.0002	(0.4209)	3.8226
		0.0520	0.0140	0.0180	0.0687	0.4492	4.4491
Lag 1	0.7298	(0.0940)			(0.0273)	1.1356	
	0.1240	0.0540			0.0730	0.6521	
Lag 2					0.1454	(0.8396)	
					0.0847	0.3801	

Source: Authors' Estimate

#### 4.5. Test for serial correlation

The results of the test for serial correlation is presented in Table 4 below:

##### Breusch-Godfrey Serial Correlation LM Test

Null Hypothesis: No serial correlation at up to 2 lags

F- Statistics	2.862549	Prob. F(2,24)	0.0767
Obs*R- squared	7.318856	Prob. Chi-Square(2)	0.0257

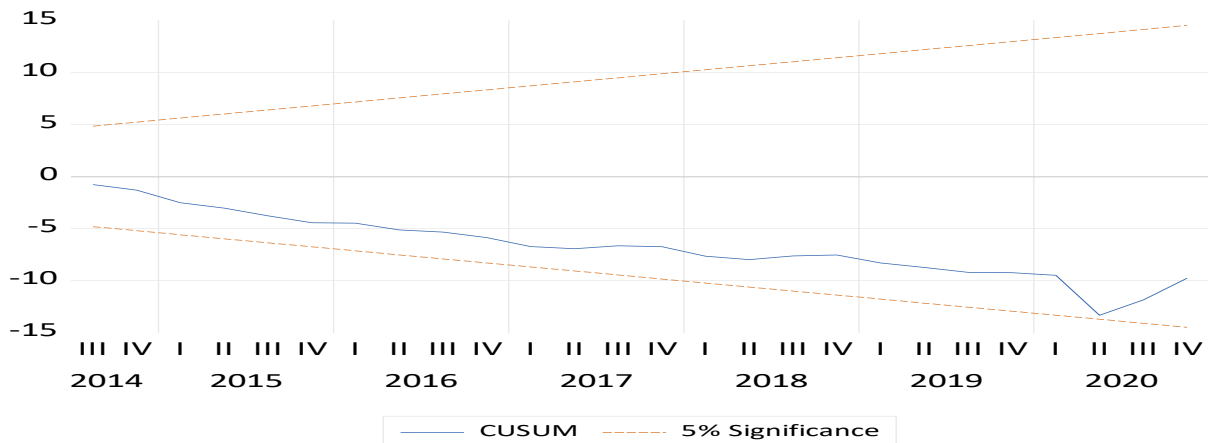
Source: Authors' Estimate

The stability diagnostic of the model was examined using the Breusch-Godfrey serial correlation test, and it revealed that the probability of the F-statistics (0.0767) was well above

5% level of significance. Thus, the null hypothesis of “no serial correlation” cannot be rejected, suggesting that the model is free from serial correlation.

#### 4.6. The ARDL model stability diagnostic test

The stability diagnostics also showed that the model used was stable (see the output of the CUSUM test below).



**Source: Authors' Estimate**

*The blue line sits between the two red lines, which means that the model is stable.*

## 5. Conclusion and policy implications.

Since the last financial crisis of 2008, governments and central banks worldwide have given closer attention to the management of debt levels in banks and other financial institutions. It came to the fore that beyond encouraging banks to lend more, there is also the need to monitor the quality of these loans as the aggregated failure of the borrowers to repay their loans have sever implications on the economy.

This stand has thus been supported by the result of this research which revealed a negative relationship between NPL and economic growth with a coefficient of -0.022. Thus, we reject the null hypothesis, which states that there is no significant negative relationship between NPLs and the Real GDP Growth rate. This suggests that a higher NPL may have reduced the banks' capacity to give out more loans to the productive sector, which will have an adverse effect on the economy. It may also suggest the bank's reluctance to give out more loans after considering that the loans already disbursed have gone wrong. Hence, rather than grant more loans, the banks may channel their energies towards recovering the delinquent loans.

Thus, it is recommended that considering the considerable effect of the financial systems on the economy, Nigeria's economic management team should include a dedicated watch on the prevailing NPL in the financial systems. Furthermore, monitoring NPL should no longer be viewed as the sole responsibility of the CBN but that of all managers of the economy; thus, any policy that could strengthen loan repayment or guard against defaults should be implemented onboard.

This research also supports the long-standing results of a positive relationship between money supply and economic growth. It revealed a positive relationship between government expenditure and economic growth in Nigeria with a coefficient of 0.001. This appears so because, in the last ten years, the Nigerian government has invested heavily in infrastructure towards bridging the actual infrastructural deficit in the country. In the last five years, the government has also had to spend heavily to pull the country out of the recession that the economy entered in Quarter 2, 2016 and Quarter 3, 2020. It, however, raises the question of how much has this heavy spending of the Nigerian government impacted economic growth in the country as the coefficient appears very minute?

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