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## EXTERNAL ENVIRONMENTAL FACTORS AND NON-PERFORMING LOANS IN NIGERIAN DEPOSIT MONEY BANKS

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### **Abstract**

*Over the years the banking sector in Nigeria has witnessed a number of crises which has been traced to the high figures of non-performing loans (NPLs) among other factors. Therefore, this study investigates the external environmental factors responsible for nonperforming loans in Nigerian Deposit Money Banks (DMBs). A time series research design approach using autoregressive distributed lag model (ARDL) method of analysis was applied. The estimated model revealed that coefficients of macroeconomic factors: Interest Rate, Exchange Rate, and Global Financial Crisis were significantly associated with NPLs. On the other hand, coefficients of social-political factors; Energy Crisis, Defense and Security Vote and Political Instability were also significantly associated with NPLs in the Nigerian DMBs. The study recommended among others that the federal government of Nigeria should provide a lasting solution to the persistent problem of energy crisis in other to reduce DMBs non-performing loans originating from high cost of business operations in Nigeria. The study thus, concluded that DMBs should pay attention to the performance of the real economy when extending loans to their customers, especially during economic boom, given the reality that loan delinquencies are likely to be higher during periods of economic downturn.*

**Keywords:** *Deposit Money Banks; Socio-Political Factors; Non-Performing Loans; ARDL*

### **1. INTRODUCTION**

Lending is the traditional function of a bank and loans constitute the bulk of their assets. In fact, it is generally accepted and acknowledged that commercial banks accept customer's deposits and use the funds to provide loans to other customers or invest in other assets with the anticipation of it yielding higher returns. That is why Olokoyo (2011) argued that customer's deposits are the main source of bank loans and this explained the positive relationship between customer's deposits and commercial bank's lending. However, in the process of making profit, banks usually encounter several risks and nowadays, the most common risk is default risk, which is responsible for non-performing loans (NPLs). NPLs commonly refers to loans which have not generated income for a relatively long period of time. This implies that the principal or interest on these loans have been left unpaid beyond the loan contract terms (Fofack, 2005). Studies in many countries have equally shown that most of the bank failures were caused by

non-performing loans. For instance, evidences showed that the rate of non-performing loans had increased substantially in early 2006 in all sectors in the US before the collapse of the sub-prime mortgage market in August 2007 (Greenidge and Grosvenor, 2010). Issues of non-performing loans had equally been a challenge in Nigeria before the recapitalization of banks in 2005. In fact, Bebeji (2013) opined that high rate of NPLs in many banks in Nigeria was one of the reasons for the 2005 banks recapitalization exercise. Nevertheless, barely four years after that reform Sanusi (2010) reported that some banks had high level of NPLs in their loan portfolios to the extent that Central Bank of Nigeria (CBN) had to bail out some of these banks to prevent any form of financial crisis. This consequently led to the establishment of Asset Management Corporation of Nigeria (AMCON) in 2010 to buy toxic (bad) loans from Deposit Money Banks in Nigeria.

It is instructive to state further that among various indicators of financial stability, banks' non-performing loan assumes critical importance since it reflects on the asset quality, credit risk and efficiency in the allocation of resources to productive sectors. A common perspective is that the problem of banks' non-performing loans is attributed to political, economic, social, technological, legal and environmental (PESTLE) factors across countries (Das and Ghosh 2003). These external environmental factors are largely outside the control and influence of a business and can potentially have both positive and negative impact on the business performance. In Nigeria, the poor state of business and economic infrastructures such as bad roads, energy crisis, insecurity, decline in capital inflow, budget deficit and growth in corruption is widely believed to have played significant role in slowing down the recovery of the economy. Essentially, the pressure from these factors on the economy has caused major dislocations in the performance and sustainability of businesses, resulting into the inability of households and firms to repay their debts (Guardian News Paper, 2015).

Therefore, considering the consequence of deteriorating loan quality of banks in Nigeria and its effects on the performance of the banking sector and the economy at larger, this research work is motivated to investigate the relationships between external environmental factors and non-performing loans in Nigerian Deposit Money Banks. The specific objectives are to: examine the effect of macro-economic factors on non-performing loans (NPLs) in the Nigerian Deposit Money Banks; and analyze the effect of socio-political factors on non-performing loans (NPLs) in the Nigerian Deposit Money Banks.

Fundamentally, numerous research works have been conducted to establish the determinants of non-performing loans in banks all over the world. Such studies included; Brownbridge, and Harvey, (1998), Ahmad (2002), Greenidge and Grosvenor (2010), Dash and Kabra (2010), Fofack (2005), Munib, and Atiya (2013) among others. In consideration of the above stated studies and within the scope of the empirical research reviewed, the researcher is tempted to ask; if the macro-economic and banks related factors are the only factors responsible for bad loans in Nigeria? This is because, the empirical literature revealed that most of the studies considered only the macro-economic and bank specific determinants of NPLs without putting into consideration the peculiarity of other issues common to developing countries such as Nigeria. These are country-specific external environmental factors such as political instability, corruption, insecurity among others which are equally responsible for NPLs in Nigeria. Hence, this study intends to fill this gap by including these socio-political variables in the empirical model alongside some macro-economic variables of interest. The scope of this study thus, covers the periods of 36 years (1981-2016). The choice of the period was based on the fact that the country witnessed a lot of external environmental issues such as insecurity, corruption, energy

crisis, economic recession and political instability which are evidences of social-political and economic structural shocks and fluctuations that characterized the trend of NPLs within these periods in Nigeria (Agu, and Basil, 2013).

## 2. LITERATURE REVIEW

The term “bad loans” as described by Basu (1998), is used interchangeably with non-performing and impaired loans as identified in Fofack (2005). According to the IMF’s Compilation Guide on Financial Soundness Indicators, NPLs is defined as:

*“A loan is non-performing when payments of interest and/or principal are past due by 90 days or more, or interest payments equal to 90 days or more have been capitalized, refinanced, or delayed by agreement, or payments are less than 90 days overdue, but there are other good reasons such as a debtor filing for bankruptcy to doubt that payments will be made in full” (IMF, 2005).*

### 2.1.2 External Environmental Factors

According to Ho (2014) external environmental factors are all external uncontrollable forces that affect the decision-making, strategies and performance of any bank. He explained that the factors are often categorized using the acronym "PESTLE." which stands for political, economic, social, technological and legal factors. The political factors take the country’s current political situation and global political condition’s effect on the country and business. Economic factors involved all the determinants of the economy such as inflation, GDP and others. The social factors are the cultural implications, the gender and connected demographics, the social lifestyles, the domestic structures, educational levels and wealth distribution. Technological factors are new discoveries, rate of technological obsolescence, rate of technological advances and innovative technological platforms. Legal factors are the various regulations, employment regulations, competitive regulations, health and financial regulations. Environmental factors are geographical location, the climate and weather, waste disposal laws, energy consumption regulation and people’s attitude towards the in environment.

## 2.2 Theoretical Underpinning

In an attempt to provide sound theoretical underpinning for the study, three theories were critically reviewed. These are: The information asymmetry theory, the financial accelerator theory and Institutional theory. The study first of all discussed the information asymmetry theory.

### 2.2.1 Information Asymmetry Theory

Information asymmetry refers to a situation where a party does not have sufficient information about the other party to make accurate investment decision. Information asymmetric also refers to a situation where business owners and manager know more about the prospects for, and risks facing their business, than the lenders (PWHC, 2002) cited in (Eppy, 2005). Akerlof (1970), identified the potential inefficiencies created by information asymmetry. He specifically, explained that due to lack of information, a lender might give his funds to an undesirable borrower (adverse selection) or the lender might engage in activities that substantially violate the initial terms and conditions of the loan contract (moral hazards).

## 2.2.2 Financial Accelerator Theory

The financial accelerator framework was developed by Bernanke and Gertler (1989), Kiyotaki and Moore (1997) and Bernanke *et al.* (1999). They provided the theoretical explanation of the role of banks during an economic fluctuation. They explained that during expansionary periods, the financial profile of borrowers improves, asset prices increase and this euphoric situation paves the way for an increase in the demand for credit. This usually results to surplus availability of credit, typically complemented with relaxed lending policy, thus increasing credit risk. The financial accelerator theory can be linked to the “Financial theory” pioneered by Minsky (1974), also known as financial instability hypothesis, in which he attempted to provide an understanding and explanation of the characteristics of financial crisis. The theory implies that, in flourishing times, when corporate cash flow increases above what is needed to settle their loan obligation, a speculative euphoria then develops, and soon thereafter debts grows beyond what the companies can settle from the income they generate. This can consequently lead to financial crisis because banks and lenders will tighten credit availability, even to companies that can afford loans and the economy then contracts.

## 2.2.3 Institutional Theory

Institutional theory was developed by Douglass North, who primarily analyzed economic structures by explaining how institution and institutional changes is affected by the performance of its environment. The core principle of the institutional theory approach provide meaningful standard for accessing organization and environment relationships with focus on the social rules, expectations, norms, and values as the sources of pressure on organizations. This theory was built on the concept of legitimacy rather than efficiency or effectiveness as the primary organizational goal (Scott, 2005). This theory also assumed that business organizations are influenced by broader social structures such as public and private regulations and the presence of non-governmental and other independent organizations that monitor corporate behavior (Campbell, 2007).

## 2.3 Empirical Studies

This section reviewed the empirical analyses and findings of some scholars on the determinants of non-performing loans in both the developed and developing economies with specific focus on studies that examined other external environmental factors.

### 2.3.1 Developed Economies

This study first of all reviewed some studies conducted in advanced economies and observed that some authors reported a pro-cyclical relationship between NPL and economic growth. For instance, Tanaskovic and Jandric (2014) studied the determinants of nonperforming loans (NPLs) in Central, Eastern and South-Eastern Europe (CESEE) countries and observed that the increase in NPLs are positively related with the GDP growth. Similarly, Erding and Abazi (2014) also analysed the NPLs of the some European countries and their empirical study showed that among macroeconomic factors, the growth of NPLs are prone to real GDP growth. However, the common view are those that supported the counter cyclical nature and relationship between NPL and economic growth such as Castro (2012) that studied credit risk in countries like Greece, Ireland, Portugal, Spain and Italy (GIPSI) by using the

dynamic panel models and found that GDP growth and share price movement are inversely related to the NPLs, whereas unemployment and interest rate are positively related. Other studies such as (Zeman and Jurca 2008; Salas and Saurina 2002; and Jimenez and Saurina 2005) among others all supported the negative relationship between NPLs and GDP growth.

### **2.3.2 Developing Economies**

This study further reviewed some studies from the perspective of developing economies. De Bock and Demyanets (2012) performed dynamic panel regressions on 25 emerging market countries covering the period 1996-2010. The study showed that real GDP contraction, currency depreciation, and weaker terms of trade are independently associated with higher NPL levels. Furthermore, Fofack (2005) investigated the determinants of non-performing loans in sub-Saharan Africa applying causality and correlation analysis. The analysis was based on data drawn from 16 African countries. The findings from the correlation results revealed a negative association between real GDP per capita and non-performing loans while it showed a positive association with exchange rate. Moreover, Munib and Atiya (2013) assessed the long and short run dynamics between non-performing loans and macro-economic variables of commercial banks in Pakistan. They concluded that macro-economic factors are the main determinants of non-performing loans in Pakistan. In Ghana, Garr (2013) applied panel OLS regression model to study the credit risk of the Ghanaian's banking industry and found out that credit risk is influenced by per capita domestic product, government borrowing among others. Though, Awuakwa-mensah and Boakye-adjei, (2015) obtained a similar result of real gross domestic product (GDP) per capita growth, they further discovered some macroeconomic variables such as previous year's inflation, and real effective exchange rate which are equally responsible for NPLs in Ghana banking industry.

#### **2.3.2.1 Macro-economic Determinants of NPLs in Nigeria**

In Nigeria, Akinlo and Emmanuel (2014) conducted a study similar to Munib and Atiya (2013) by assessing the long and short run dynamics between nonperforming loans and macro-economic variables in Nigeria. The study revealed that in the long run, economic growth is negatively related to non-performing loan while exchange rate, credit to the private sector and unemployment exerts positive influence on non-performing loans in Nigeria. In the short run, credits to the private sector, exchange rate, lending rate and stock market index are the main determinants of non-performing loans. Also, adopting the model of Munib and Atiya (2013), Yahaya and Oni (2016) investigated the impact of macroeconomic factors responsible for non-performing loans in the Nigerian Deposit Money Banks (DMBs). The findings revealed that, inflation, foreign exchange rate and credit to the private sectors are statistically significant with non-performing loans of the deposit money banks in Nigeria. Even though Yahaya and Oni (2016) reported a significant relationship between credits to the private sector, exchange rate and non-performing loans which is similar to the report of Akinlo and Emmanuel, (2014). Nonetheless, other variables revealed lacked consensus. Futhermore, Adeola, and Ikpesu, (2017), examined the macroeconomic determinants of non-performing loans in Nigeria. They obtaining a significant effect of unemployment rate on NPLs in line with the findings of Akinlo and Emmanuel, (2014). They discovered that out of the six macroeconomic variables used in the study, only lending rate, M2GDP, and unemployment rate determines NPL in Nigeria. Finally, Timothy, Samuel, and Ikl, (2017) similarly examined macroeconomic determinants of non-performing loans in Nigeria. They obtained a positive relationship between money supply,

gross domestic product and non-performing loans. The result obtained however, is contrary to the findings of (Akinlo and Emmanuel 2014; and Yahaya and Oni, 2016).

### 2.3.3 Studies that Examined Other External Environmental Factors

The empirical review further examined studies that captured more external environmental factors beyond macro-economic factors. Nevertheless, most of these studies applied descriptive methods of analysis especially from the perceptions of bankers in developing economies. For instance, in Africa, Joseph, Edson, and Gwangwava (2012) studied the causes of non-performing loans in Zimbabwe banks. They concluded that the major factors responsible for nonperforming loans were government policy, integrity of the borrower and natural disasters. Also in Kenya, CBK (2001), discovered that improvement in the Country’s judicial system is critical for a speedy resolution of the non-performing loan challenges. In Asia, Muhammad, Ammara, Abrar and Fareeha (2012) examined the perception of Pakistani bankers regarding the economic factors causing non-performing loans in the Pakistani banking sector since 2006. The study revealed that Energy Crisis, among other is responsible for non-performing loans in Pakistani banking sector. Similarly, in Bangladesh, Alam, Hag and kader, (2015) revealed that the country has suffered from a large amount of non-performing loans in the banking industry mainly due to political instability, fund diversion, board of directors’ interference, engagement of corrupted bankers, aggressive banking due to enhanced competition, falling in real estate business, weak monitoring and lack of coordination among related parties. Finally, in Nepal, Bhattarai (2014) discovered that bankers of Nepalese commercial bank perceives that energy crisis, lack of timely budgetary expenditure by the government and instable political environment increases the non-performing loans of the banking sector.

## 3. METHODOLOGY

This study adopted and modified the model from Munib and Atiya, (2013). The variables dropped from the original model are Treasury Bill (TB) and Money Supply, while Balance of Trade, Unemployment Rate, Lending Rate, Security Vote, Corruption Index, Energy Crisis, Political instability and Global Financial Crisis were adopted based on the gap identified from the empirical studies. Also Bank Reform dummy variable was included in the model as control variable. The modified version of the model becomes:

$$NPL_t = f(DSV, GGDP, ENGC, NBR, LR, INF, GFC, EXR, CI, UER, BOT, PI), \dots (3.1)$$

The explicit form of equation (3.1) above is represented as follows:

$$NPL_t = \beta_0 + \beta_1 DSV_t + \beta_2 GGDP_t + \beta_3 ENGC_t + \beta_4 NBR_t + \beta_5 LR_t + \beta_6 INF_t + \beta_7 GFC_t + \beta_8 EXR_t + \beta_9 CI_t + \beta_{10} UER_t + \beta_{11} BOT_t + \beta_{12} PI_t + U_t \dots \dots \dots (3.2)$$

When transformed into a log form equation (3.3) becomes:

$$NPL_t = \beta_0 + \beta_1 DSV_t + \beta_2 GGDP_t + \beta_3 ENGC_t + \beta_4 NBR_t + \beta_5 LR_t + \beta_6 INF_t + \beta_7 GFC_t + \beta_8 EXR_t + \beta_9 CI_t + \beta_{10} UER_t + \beta_{11} BOT_t + \beta_{12} PI_t + U_t \dots \dots \dots (3.3)$$

Where:

$NPL_t$ : It is the Non-performing loans of all Deposit Money Banks in Nigeria within the covered period (Dependent variable)

$SVOTE_t$ : It is the Security Vote in the Nigerian Budget in time period “t” (This is to proxy for Insecurity in Nigeria).

$GDPG_t$ : It is the growth in GDP in time period “t”

$ENGC_t$ : It is the measure of energy crisis in Nigeria in time period “t” (Note that electricity power consumption “Kwh per capital” is used to proxy for energy crisis in Nigeria).

$NBR_t$ : It is the dummy control variable of Bank Reforming in Nigeria in time period “t” ( 0: time period “t” before recapitalization reform of 2005 and 1: time period “t” after recapitalization reform of 2005)

$LR_t$ : It is the lending rate in time period “t”

$INF_t$ : It is the inflation rate in time period “t”

$GFC_t$ : It is the dummy variable representing the global financial crisis in Nigeria in time period “t” ( 0: time period “t” before and after the crisis and 1: time period “t” during the crisis from 2008 to 2010)

$CI_t$ : It is the corruption index in Nigeria in time period “t”

$UER_t$ : It is the unemployment rate in time period “t”

$EXR_t$ : It is the exchange rate in time period “t”

$BOT_t$ : It is the balance of trade of the economy in time period “t”

$PI$ : It is the political instability of the economy in time period “t” (This is also proxy for Insecurity in Nigeria).

$U_t$ : error term controlling for unit-specific residual in the model

$\beta_0$ : intercept of the regression line

The apriori expectations of the model are explained in table 3.1 below.

**Table 3.1: Apriori Expectations on Independent Variables’ in Relationship with NPLs**

Variables	Relation with NPLs	Supporting Scholars
Defense and Security Vote	Positive	Alam, HagandKade (2015) and Bhattari (2014)
Growth in GDP	Negative	Dash and Kabra, Shu, (2002); Rajan and Dhal, (2003); Fofack, (2005); Munib and Atiya, (2013)
Energy Crisis	Positive	Lee (2005), Ammara, Abrar and Farahi (2012), Bhattari (2014)
Dummy of Bank Reform	Negative	Bebeji (2013)
Lending Rate	Positive	Zeman and Jurca (2008), Pestova and Mamonov (2013) and Akinlo and Emmanuel, (2014)
Inflation Rate	Positive	Babihuga, (2007); Dash and Kabra, (2010)
Global Financial Crisis	Positive	Khaled (2017)
Exchange Rate	Positive	Ammara, Abrar and Farcehi (2012), Fofack (2005); and Munib and Atiya, (2013)
Corruption Index	Positive	Ahmad (2013)
Unemployment Rate	Positive	(Louzis, Vouldis and Metaxas, 2010). Baboucek and Jancar (2005) and Castro (2013)
Balance of Trade	Negative	Bemyanets (2012)
Political Instability	Positive	Alam, HagandKade (2015) and Bhattari (2014)

Source: Research Findings, (2019).

The study adopted an “*ex-post facto*” research design. Secondary data obtained from Central Bank of Nigeria (CBN) statistical Bulletin 2016 various issues, the World Bank and Nigerian budget were used in this study. This study used E-view 9 statistical software for the analysis of the time series data. The choice of the software was based on the fact that it is, universally accepted, simple and easy to apply to time series data.

## 4. FINDINGS AND DISCUSSION

### 4.2 Unit Root Test

Table 4.1 showed the unit root of dependent and independent variables applied in the study. Engle and Granger (1987) explained that a reasonable regression can only be done when all variables are stationary. Therefore, this study conducted a unit root test using Augmented Dickey-Fuller (ADF) method. See table 4.1 below:

**Table 4.2: The Results of Augmented Dickey-Fuller (ADF) test for unit root**

Variables	ADF Calculated Value at Level	ADF Calculated Value at 1st Difference	McKinnon at Critical Value	Order of Integration
BOT*	-4.560484	-----	-4.339330	I(0)
CI*	-3.330904	-6.551409	-3.639407	I(1)
ENGC*	-2.160265	-6.865842	-3.646342	I(1)
EXR**	-1.386009	-3.995144	-3.548499	I(1)
INF**	-3.350535	-----	-2.948404	I(0)
NPL*	-2.090114	-5.209768	-4.252879	I(1)
LR*	-2.182575	-5.382539	-4.262735	I(1)
UER*	-2.758444	-6.403652	-4.252879	I(1)
GGDP*	-3.166946	-7.875069	-4.252879	I(1)
DSV*	-2.951125	-6.830625	-4.252879	I(1)

**Source: Author's Computation, (2019)** Note: \*Significant at 1 per cent level of significance, \*\*Significant at 5 per cent level of significance.

The unit root test on table 4.2 reveals variables of balance of trade and inflation rate (BOT and INF) to be stationary at level while all other variables (CI, ENGC, EXR, NPL, LR, UER, GGDP, DLSV) are stationary at first difference, which means they are integrated at first order, I(1). The present study therefore, utilizes the autoregressive distributed lag model (ARDL) of Pesaran et al. (2001) which is applicable irrespective of the order of integration of the underlying variables ( $I(0)$  and/or  $I(1)$ ) provided absence of  $I(2)$  are guaranteed which could invalidate the procedure. The ARDL model is usually verified through the stability tests called Cumulative Sum of Recursive Residuals (CUSUM). Therefore, the stability of the long run coefficients together with the short run dynamics is tested using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests. This technique is suitable for small and finite sample sizes (Pesaran, et al.2001), which is ideal for our sample of 35 observations.

### 4.3 Multicollinearity Test

One of the assumptions of the linear regression model is that there is no multicollinearity among the independent (explanatory) determinants. If correlation between explanatory determinants is high, the estimation of the regression coefficients is possible, but with large standard errors and, as a result, the population values of the coefficients cannot be estimated precisely.

**Table 4.3: The Pearson's Coefficients of Correlations Matrix**

	LDSV	GGDP	NBR	LR	GFC	EXR	CI	BOT	UER	PI	LINF	ENGC
DSV	1											
GGDP	-0.51102	1										
NBR	0.465008	-0.15371	1									
LR	0.514669	-0.28018	-0.12552	1								
GFC	0.18317	-0.22882	0.484123	-0.04087	1							
EXR	0.575728	-0.41343	0.55239	0.160366	0.317275	1						
CI	0.506659	-0.26265	0.657651	0.390957	0.370065	0.524996	1					
BOT	0.522606	-0.38115	0.605268	-0.05314	0.390495	0.648434	0.638304	1				
UER	0.560864	-0.52435	0.585597	0.022695	0.513356	0.609972	0.562243	0.58717	1			
PI	-0.43540	0.206878	-0.54772	0.137879	-0.26517	-0.78345	-0.48351	-0.54238	-0.75061	1		
INF	-0.17338	-0.10318	-0.35306	0.319205	-0.06277	-0.35762	-0.13564	-0.26461	-0.38713	0.40459	1	
ENGC	0.581891	-0.23874	0.698027	0.104117	0.312157	0.670989	0.593856	0.693997	0.53112	-0.47547	-0.21955	1

**Source: Author's Computation, (2019)**

According to Kennedy (2008) multicollinearity is a problem when the correlation is above 0.80, which was not the case here (see table 4.3). The matrix shows that, in general, the correlation between the determinants was not strong, suggesting that multicollinearity problems were either not severe or non-existent (Table 4.3).

#### 4.4 Optimal lag Length Selection

Vector Autoregressive, VAR, was used to determine the optimal lag length for the ARDL co integration test which was based on the AIC criterion as shown in table 4.4. From the result, the optimal lag length is 1 according to AIC and which is consistent with most of the other criteria. Using this optimal lag length, the likelihood ratio test which depends on the Maximum Eigen values of the stochastic matrix of the Johansen (1991) procedure for exploring the number of co integrating vectors was employed as shown in table 4.4.

**Table 4.4: Lag Selection Result**

VAR Lag Order Selection Criteria						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	1.728782	NA*	0.131975	0.751415	1.358600	0.945658
1	2.574291	0.901877	0.135620*	0.761714*	1.415606*	0.970900*
2	3.396146	0.821855	0.140061	0.773590	1.474189	0.997718
3	3.407973	0.011038	0.153280	0.839468	1.586774	1.078538
4	3.746849	0.293693	0.164891	0.883543	1.677555	1.137555
5	5.451896	1.364038	0.162831	0.836540	1.677259	1.105493

Source: Author's Computation, (2019)

#### 4.5 Bound Test

After determining the lag length requirement of the ARDL analysis the study thus, conducted Bound Test to establish the existence of a long run relationship between the dependent variable and the explanatory variables (Belloumi, 2010). The result of the bound test was shown in table 4.5 below:

**Table 4.5: Bound Test Result**

ARDL Bounds Test		
Test Statistic	Value	K
F-statistic	1.529724	11
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	6.58	8.21
5%	8.21	9.8
2.5%	9.8	11.79
1%	11.79	9.81

Source: Author's Computation, (2019)

From table 4.5, the calculated F-statistic for the model is 1.529, which is lower than the lower bound of 8.21 at 5% level of significance for the chosen explanatory variables, thus indicating that there is no co-integration between NPLs and various independent variables. This implies no long-run relationship in the model.

#### 4.6 Short Run Regression Analysis

Since the study revealed no long run relationship among the model variables, the study then, analyzed the short run regression. The result of the short run regression analysis was shown in table 4.6. Hence, from the preliminary analysis and ARDL regression results, the co-integration test showed no existence of a unique long-run relationship in the model. This was confirmed through the co-integrating equation (CointEq (-1)) in the model which is negative

but not significant at the 5 percent level. This therefore, confirmed our earlier results from the bound test which necessitated the estimation of the short-run ARDL model see table 4.6.

**Table 4.6: Short Run Regression Analysis Result**

Dependent Variable: D(LNPL)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(LDSV)	0.588667	0.184140	3.196839	0.0045
D(GGDP)	-1.421373	2.968432	-0.478830	0.6373
D(ENERGY)	0.012968	0.004243	3.056328	0.0313
D(NBR)	-0.297732	0.375089	-0.793762	0.4367
D(LR)	0.040442	0.020364	1.985955	0.0489
D(LINF)	0.194605	0.126355	1.540143	0.1392
D(GFC)	1.656842	0.378019	4.382955	0.0003
D(EXR)	0.016442	0.005490	2.995040	0.0072
D(CI)	0.039660	0.250784	0.158143	0.8759
D(UER)	0.008566	0.032536	0.263261	0.7950
D(BOT)	-0.000082	0.000079	-1.042266	0.3097
D(PI)	1.228461	0.409865	2.997236	0.0071
CointEq(-1)	-0.774152	0.165671	-4.672817	0.2341
R-squared		0.945653		
Adjusted R-squared		0.841900		
F-statistic		9.114434		
Prob(F-statistic)		0.000284		
Durbin-Watson stat		1.937462		

**Source: Author's Computation, (2019)**

The model on table 4.6 further revealed that the coefficient of lending rate (LR) is positive and significant, which is in accordance with a prior expectation and the financial accelerator theory. Lending rate has a pro-cyclical relationship with credit risk while it has a countercyclical relationship with economic growth. This implies that lending rate has effect on borrowers' ability to repay, and thus affect non-performing loans in the Nigerian Deposit Money Banks (DMBs). This finding is consistent with many previous findings such as (Fofack, 2005), (Pestova and Mamonou, 2013), and (Zaman and Jurca 2008), (Khemraj and Pasha, 2009) and (Akinlo and Emmanuel, 2014). Conversely, the magnitude of the coefficient estimate is low at 0.040 (4%). This is because as interest rate increases, prudent borrowers are more likely to decide that it would be unwise to borrow. However, few borrowers with high risky investment appetites who are usually willing to pay higher interest rates may approach the bank for loan facilities. Successively banks may grant such request (adverse selection) and most likely increase their credit risk exposure. Farhan et al. (2012) confirmed that banks with aggressive lending policies charging high interest rates from the borrowers will eventually have greater non-performing loans.

Also, the coefficient estimate of exchange rate (EXR) is statistically significant at 1% significant level with a positive coefficient estimate of (0.016). This implies that, an increase in EXR (depreciation of Nigerian naira in terms of dollar) can lead to an increase in NPLs of banks in Nigeria. However, the magnitude of the coefficient (1.6%) indicates that the co-movements between the real effective exchange rate and NPLs is not strong as reported.

Nevertheless, the positive effect (depreciation of Naira in terms of dollar) implies that the debt-servicing capacity of borrowers who borrow in foreign currency (import-oriented firms) may be weakened. This outcome is consistent with the financial accelerator theory that supported the pro-cyclical view of positive relationship between credit risk and exchange rate depreciation as well as the empirical findings of (Fofack 2005; Casto 2013; Munib and Atiya 2013; Tanaskovic and Jandric 2014 and Yahaya and Oni 2016).

The last significant macro-economic variable adopted in the model is the global financial crisis dummy variable that was used to examine the effect of GFC on NPLs in the Nigerian banking industry. The result revealed that global financial crisis that started in 2007 seriously affected Nigerian banking industry during the period 2008-2010 as the coefficient value of 1.65 which accounted for the highest significant positive coefficient in the study. This implies that the global financial crisis of 2007 is one of the major determinants of NPLs in the Nigerian banking industry. This is consistent with the financial accelerator theory that supports the pro-cyclical view of positive relationship between credit risk and global financial crisis. Therefore, the positive significant effect of global financial crisis on NPLs is majorly supported by the study of Khaled, (2017).

The socio-political variable of defense and security vote was used to proxy for National Insecurity. This is because National Insecurity which cannot be captured in quantitative term. Defense and Security Vote (DSV) reveals a significant positive coefficient (0.58). This finding is also in line with the findings of Alam, Hag and kader, (2015) that insecurity significantly determine NPLs in Nigeria. As a misguided solution to the multifarious crises of national security, the government has consistently increased the annual fiscal allocation to internal security and defense within the period under study. Therefore, the annual increase in the Defense and Security Vote (DSV) is an evidence of insecurity in the country and it continually caused the growth of NPLs in Nigeria. The annual increment in the (DSV) means that there are serious security challenges in the country within the period covered by the study. This explains that where and when there is insecurity challenge in the country it is difficult for banks to recover loans. This result can be supported with the Institutional theory which explains the perceived overall government-business interface which has an effect on conduciveness of the environment for banking business.

Also, the study examined the effect of Political Instability (PI) on NPLs in Nigerian DMBs. The coefficient of the political instability dummy also has positive coefficient sign. The finding shows that Political Instability (PI) is significant with a coefficient of 122%. This confirms that political instability has the highest significant coefficients in the model. As expected, the overall impact of the intermittent political unrests as well as the long years of military rule in the country over the covered period was responsible for bad loans in the Nigerian DMBs. This could be related to all forms of political instability and interference in the affairs of banks especially during the military rule which led to so many bad loans. The issue of political instability effects on NPLs is largely consistent with the study of Alam, Hag and kader, (2015) and Institutional theory that explained the positive influence of political instability on NPLs.

Energy crisis equally shows a coefficient value of 0.012 (1%) which is statistically significant at 1% level of significance. This result points out that energy crisis has a significant positive relationship with NPLs and is consistent with the study conducted by Farham et al. (2012) and Kuutol, Agyeman, and Owusu-Adjei, (2015) as well as institutional theory. Even

though Nigeria has one of the largest oil and gas reserves in the world, as well as being Africa's largest oil producer, but the country is still experiencing high rate of energy crisis. The absence of a functioning power sector in Nigeria has made the populace to continually look for alternative but expensive and unreliable source of power. Farham et al. (2012) stated that energy crisis does not only affect the production of businesses but affects also the debt servicing capacity of the borrowers as alternative sources to produce the energy are very costly causing huge cost of production. It is obvious that energy crisis in Nigeria till date has crumbled many industries, and have caused small businesses to shut down operation. Hence, Kuutol, Agyeman and Owusu-adjei (2015) confirmed that energy crisis is responsible for high cost of business operations in Africa and could affect the loan repayment facilities given to them.

#### 4.6.1 Post Estimation Diagnostic Test

The diagnostic aspect of the result reveals that Durbin- Watson was 1.937462 which is close to 2; implies the absence of first order autocorrelation in the regression model (Field, 2005). Therefore, we were able to make valid prediction(s) with the equation. Moreover, the coefficient of multiple determinations - R-squared is 0.945653 which shows that 94.56% of the variation in Non-performing Loans (NPLs) in Nigerian DMBs is caused by the variations in the explanatory variables as explained by the model. This shows that about 6% change in the dependent variable is caused by other variables not found in the equation but measured by the error term. The F-statistics of the entire model is 9.114434 and significant at 1 percent level of significance; hence the model is of good fit. To authenticate the reliability of the result, table 4.8 further reveals that the correlation result which is 1.765781 is not significant at 5 per cent indicating that the variables used in the model are not serially correlated while the normality test conducted reveals the Jarque-Bera test value of 0.465029 which is not significant at 5% level of significance implies that the variables in the model are normally distributed (Jacques and Bera, 1987). Furthermore, the heteroskedacity test shows that there is no heteroskedasticity in the research model as the Prob. Chi-Square (2) is also not significant at 5%. Also, residual test of the model is conducted using serial correlation and normality test to authenticate the reliability of the result (see table 4.8).

**Table 4.8: Residual Test Result**

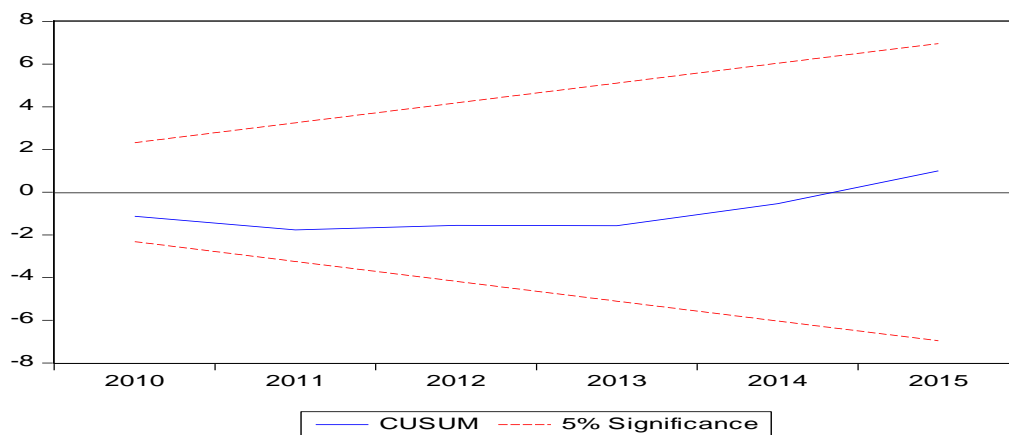
Breusch-Godfrey Serial Correlation Test		Normality Test		Breusch-Pagan-Godfrey Heteroskedasticity Test	
Obs*R-squared	1.765781	JarqueBera	0.465029	Obs*R-squared	0.3712
Prob.Chi-Square(2)	0.4136	Probability	0.792538	Prob.Chi-Square(17)	0.4302

**Source: Author's Computation, (2019)**

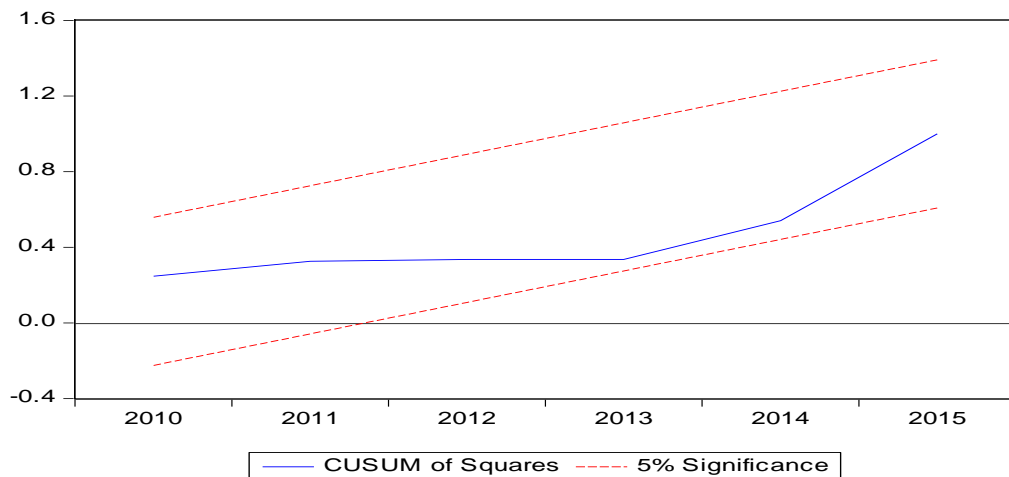
### 4.6.3 Model Stability Test

This study equally tested the stability of the selected ARDL model using cumulative sums of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) stability testing technique presented by Brown *et al.* (1975). CUSUM and CUSUMSQ plots have been shown in Figures 4.1 and 4.2 respectively. Cumulative sum test helps to show if coefficients of regression are changing systematically whereas cumulative sum of square test revealed the possibility of the coefficients in regression changing suddenly (Bhatti, et al. 2006). Since both the plots remain within critical bounds at 5 percent level of significance, we concluded that the model is structurally stable. This implies that there is no structural break and that the parameters is stable.

**Figure 4.1 Cumulative Sums of Recursive Residuals (CUSUM)**



**Figure 4.2 Cumulative Sums of squares of recursive residuals (CUSUMSQ)**



## 5. CONCLUSION AND RECOMMENDATIONS

This paper has empirically examined the relationships between external environmental factors and NPLs in the Nigerian Deposit Money Banks. The estimated model took into consideration several NPLs determinants in accordance with the empirical literature. The findings discovered that macroeconomic variables: Interest Rate, Exchange Rate (EXR), and Global Financial Crisis (GFC) and social-political factors: Defense and Security Vote (DSV) and Political Instability (PIS) were significant determinants of NPLs in Nigerian DMBs. The study also included the 2005 bank reform (NBR) restructuring policy of CBN as control

variable. However, the findings revealed that, Nigeria Banking Reform (NBR) has no significant effects on NPLs of DMBs in Nigeria alongside other variables such as Growth of Gross Domestic Product (GGDP), Inflation Rate (LINF), Balance of Trade (BOT), Corruption Index (CI) and Unemployment Rate (UER). Finally, the effects of macro-economic determinants of NPLs were linked to the financial accelerator theory. The theory explained the behavior of banks during the time of economic fluctuation. The theory also described the procyclical and countercyclical behavior of the macroeconomic variable in respect of NPLs. On the other hand, socio-political factors were linked to Institutional theory. The Institutional theory explained the effects of social-political environment influence on banks and its customers and the extent to which government policies and programmes can influence their credit risk appetites. It is worthy of note to state that both macro-economic and socio-political external environmental factors have the predispositions to influence the decision of lenders when selecting and taking credit related decisions (Information asymmetries). This can consequently lead to the problems of adverse selection and moral hazard. Conclusively, DMBs should pay attention to the performance of the real economy when extending loans to their customers, especially during economic boom, given the reality that loan delinquencies are likely to be higher during periods of economic downturn. For future studies more external environmental factors should be incorporated to reveal a better result and provide more information on the determinants of NPLs in Nigeria.

In the light of the above, the following recommendations were made in line with the results generated from the study:

That CBN should intensify efforts to ensure that monetary policies targeted towards stability in exchange rate is formulated or maintained in order to stem any inflationary tendencies which can heighten the level of NPLs in Nigeria. That the federal government of Nigeria should provide a lasting solution to the persistent problem of energy crisis in order to reduce DMBs non-performing loans originating from high cost of business operations in Nigeria.

The study revealed that lending rate has an influential impact on the level of NPLs. Hence, monetary authority should impose moderate lending rate and encourage banks to compensate its costs of lending by increasing other fees and commission charges on non-interest products of the bank so as to reduce high cost of capital. Finally, CBN should collaborate with risk management organizations such as Nigeria Agricultural Insurance Corporation (NAIC), Nigeria Incentive-based Risk Sharing Agricultural Lending (NIRSAL) and National Insurance Commission (NAICOM) of Nigeria to come up with a new insurance products that can cover bank loans losses during crisis.

## REFERENCES

- Adeola, O., & Ikpesu, F. (2017). Macroeconomic determinants of non-performing loans in Nigeria: An Empirical Analysis. *The Journal of Developing Areas*, 51(2), 31-43.
- Agu, O. C., & Basil, C. O. (2013). Credit management and bad debt in Nigeria commercial banks –Implication for development. *Journal of Humanities and Social Science*, 12 (3), 47-56.
- Ahmad, F. (2013). Corruption and information sharing as determinants of non-performing loans. *Business systems research journal: international journal of the Society for Advancing Business & Information Technology (BIT)*, 4(1), 87-98.
- Ahmad, N. H. (2002). Financial crisis and non-performing loans: The Malaysian Banks Experience. *International Journal of Finance*, 14(2).

- Akerlof, G.(1970). The market for lemons: Qualitative uncertainty and the market mechanism quarterly journal of economics, 84(3)
- Akinlo, O., & Emmanuel, M. (2014). Determinants of non-performing loans in Nigeria. *Accounting & taxation*, 6(2), 21.
- Alam, S., Haq, M. M., & Kader, A. (2015). Nonperforming loan and banking sustainability: Bangladesh perspective. *International Journal*, 3(8), 1197-1210.
- Ammara, S., Abrar., H, C., Fareeha., K(2012) . Economic determinants of non-performing loans: perception of Pakistani bankers. *European journal of business and management*, 4(19), 12-16
- Awuakwa–Mensah, F., & Boakye–Adjei, A. (2015). Determinants of non–performing loans in Ghana banking industry. *International Journal of Computational Economics and Econometrics*, 5(1), 35-54.
- Babihuga, R. (2007). Macroeconomic and Financial Soundness Indicators: An Empirical Investigation. IMF Working Paper.
- Babouček, I., &Jančar, M. (2005). Effects of macroeconomic shocks to the quality of the aggregate loan portfolio. *Czech National Bank*.
- BasuAnupam (1998). “Banking system reforms in Sub-Saharan Africa: Status and challenges”, International Monetary Fund (Unpublished).
- Bebeji, A. (2013). Consolidation and Asset Quality of Banks in Nigeria. *International Journal of Business and Management Invention*, 2(2), 12-20
- Belloumi, M. (2010). The relationship between tourism receipts, real effective exchange rate and economic growth in Tunisia. *International Journal of Tourism Research*, 12(5), 550-560.
- Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of macroeconomics*, 1, 1341-1393.
- Bernanke, B., & Gertler, M. (1989). Agency costs, net worth, and business fluctuations. *The American Economic Review*, 14-31.
- Bhattarai, S. (2014) Determinants of Non-Performing Loan in Nepalese Commercial Banks. *Economic Journal of Development Issues*, 19(1-2), 22-38.
- Brownbridge, M., & Harvey, C. (1998) *Banking in Africa: The impact of financial sector reform since independence*, James Currey, Oxford, Africa World Press, Trenton, E.A.E.P., Nairobi, and Fountain Publishers, Kampala.
- Campbell, J. L. (2007). Why would corporations behave in socially responsible ways? An institutional theory of corporate social responsibility. *Academy of management Review*, 32(3), 946-967.
- Castro, V. (2013). Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI. *Economic Modelling*, 31, 672-683.
- Castro, V., 2012. Macroeconomic determinants of the credit risk in the banking system: The case of the GIPSI, Working Paper, 12.Group of Financial and Monetary Studies (GEMF)
- Central Bank of Kenya(CBK)., 2001. bank supervision annual report 2008. Also accessed from [www.cbk.co.ke](http://www.cbk.co.ke) on 31/02/2001
- Dash, M., & Kabra, G. (2010). The determinants of non-performing assets in Indian commercial bank: An econometric study. *Journal of Middle Eastern Finance and Economics*, 7 (12), 94-106.
- De Bock, R. & Demyanets A. (2012). *Bank asset quality in emerging markets: Determinants and spillovers*, Working Paper 12/71. IMF
- Engle, R.F., & Granger, C.W. (1987). Co-integration and error correction, representation, estimation and testing econometrics, 55(2), 251-276
- Eppy, I. (2005). Perceived information asymmetry, bank lending approaches and bank credit accessibility by smes in Uganda. (Unpublished thesis) Makerere University.
- Erdinç, D. & Abazi, E., 2014. The determinants of NPLs in emerging Europe, 2000-2011. *Journal of Economics and Political Economy*, 1(2), pp. 112-125.

- Farhan, M., Sattar, A., Chaudhry, A. H. & Khalil F. (2012). Economic determinants of non-performing loans: perceptions of Pakistani bankers. *European Journal of Business and Management*, 4(19), 87-100.
- Festić, M. Kavkler, A. and Repina, S., 2011. The Macroeconomic Sources of Systemic Risk in the Banking sectors of five new EU member States. *Journal of Banking and Finance*, 35(2), pp. 310-322.
- Fofack, H. (2005), *Non-performing loans in sub-saharan Africa: Causal analysis and macroeconomic implications* (Policy Research Working Paper no 3769), Washington, DC: World Bank.
- Garr, D.K., 2013. Determinants of Credit Risk in the Banking Industry of Ghana. *Developing Country Studies*, 3(11), pp. 64-77
- Greenidge, K., & Grosvenor, T. (2010). Forecasting non-performing loans in Barbados. *Journal of Business, Finance & Economics in Emerging Economies*, 5(1).
- Ho, J. K. K. (2014). Formulation of a systemic PEST analysis for strategic analysis. *European academic research*, 2(5), 6478-6492.
- International Monetary Fund (IMF) (Ed.). (2005). *Annual Report on Exchange Arrangements and Exchange Restrictions, 2005* (Vol. 2005). International Monetary Fund.
- Jakubík, P., & Reininger, T. (2013). Determinants of nonperforming loans in Central, Eastern and Southeastern Europe. *Focus on European Economic Integration*, 3, 48-66.
- Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: Journal of the Econometric Society*, 1551-1580.
- Joseph, M.T., Edson, G., Manuere, F., Clifford, M., & Micheal, K.(2012). Non-performing loans in commercial banks a case of CBZ bank limited in Zimbabwe. *Interdisciplinary journal of contemporary research in business*, 4(7) 467-488
- Kalina, J. (2011). On heteroscedasticity in robust regression. In *International Days of Statistics and Economics Conference Proceedings, September 22-23* (pp. 228-237).
- Kennedy, P. (2008). *A Guide to Econometrics*. Malden, Mass: Blackwell Publishing.
- Khemraj, T., & Pasha, S. (2009). The determinants of nonperforming loans: An Econometric Case Study of Guyana, presented at the Caribbean Centre for Banking and Finance Bi-annual Conference on Banking and Finance, St. Augustine, Trinidad.
- Kiyotaki, N., & Moore, J. (1997). Credit cycles. *Journal of political economy*, 105(2), 211-248.
- Kuutol, P. K., Agyeman, B., & Owusu-Adjei, C. (2015). Bankers perception of economic determinants of non-performing loans in Ghana. *International Journal of Financial Markets*, 1(3), 93-101.
- Lee, C. C. (2005). Energy consumption and GDP in developing countries: a cointegrated panel analysis. *Energy economics*, 27(3), 415-427.
- Louzis, D.P., Vouldis, A & Metaxas, V. (2011). *Macroeconomic and bank-specific determinants of non-performing loans in Greece: a comparative study of mortgage, business and consumer loan portfolios*. Bank of Greece Working Paper no 118.
- Minsky, H. P.(1974). *The modeling of financial instability: An introduction. modeling and simulation*, 5(1), 267-272.

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- Muhammed, F., Ammara, S., Abrar, H. C., Fareeha, K.(2012). Economic determinant of non-performing loans. Perception of Pakistani bankers. *European journal of business and management*. 4(19), 12-16
- Munib, B., & Atiya, Y. J.(2013). Impact of Macroeconomic forces on non-performing loans: An empirical study of commercial banks in Pakistan. *WSEAS Transactions on business and economics*, 1(10), 34-40.
- Olokoyo, F. O. (2011). Determinants of commercial banks' lending behavior in Nigeria. *International Journal of Financial Research*, 2(2), 61.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, 16(3), 289-326.
- Pestova, A. & Mamonov, M., (2013). *Macroeconomic and bank-specific determinants of credit risk: evidence from Russia*. EERC Research Network Working paper Series, 13.
- Rajan, R., & Dhal, S. C. (2003). Non-performing loans and terms of credit of public sector banks in India: An empirical assessment. *Reserve Bank of India Occasional Papers*, 24(3), 81-121.
- Rinaldi, L. & Sanchis-Arellano, A. (2006). *Household debt sustainability: What explains household non-performing loans? An empirical analysis*. ECB Working Paper No.570
- Salas, V., & Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of financial services research*, 22(3), 203-224
- Scott, W. R. (2005). Institutional theory: Contributing to a theoretical research program. *Great minds in management: The process of theory development*, 37, 460-484.
- Tanasković, S., & Jandrić, M. (2015). Macroeconomic and institutional determinants of non-performing loans. *Journal of Central Banking Theory and Practice*, 4(1), 47-62.
- Timothy, T., Samuel, T., & Ikl, S. C. (2017). Macroeconomic Determinants of Non-Performing Loans in Nigeria. *Imperial Journal of Interdisciplinary Research*, 3(7).
- Yahaya, K. A., & Oni, O. O. (2016). Impact of macroeconomic factors on non-performing loans in the Nigerian Deposit Money Banks.(DMBs), *Amity Global Business Review*, 11.
- Zeman, J., & Jurca, P. (2008). *Macro stress testing of the Slovak banking sector*. National bank of Slovakia working paper, 1.