

Macroeconomic Determinants of Non-Performing Loans in Nigeria

Tyona, Timothy¹, Tyohemba, Samuel² & Eya, Criscent Ike³

^{1,2}Department of Accounting and Finance University of Agriculture Makurdi, Benue State Nigeria

³Research and Data Analysis Unit, Smart Consult, Makurdi, Benue State Nigeria

Abstract : *This study investigates the impact of macroeconomic determinant of non-performing loans in Nigeria. Data from 1982-2015 was sourced from Secondary sources. Using the error correction methodology, the study reveals a strong positive relationship between non-performing loans and selected macroeconomic variables in the short run including Money supply (MOS) and Gross Domestic Product (GDP). Further, the study recommends for the introduction of measures that will minimized the incidence of non-performing Loans in Nigeria*

Key words: *non-performing Loan, Error Correction, Nigeria.*

1.0 INTRODUCTION

Understanding the nature of bank loans losses has numerous implications. Low levels of NPL suggest a relatively more stable financial system. Sizeable volume of NPL signed the existence of fragility and a cause for worry for regulatory authorities and bank managers (Adebola, Yuisuf and Dahalan, 2011).

Non-Performing Loan is loan which does not provide incomes anymore and full payment of the principal and interest is not provided (Shingjergji *et al.*, 2013). NPL could also be seen as loans whose maturity date has passed and the payment has not been concluded. A loan is considered non-performing when the person or entity that has obtained it becomes a problem for its payment (Obamuyi, 2007).

NPL are one of the most serious obstacles that banks in Nigeria face. This still persist. Before now, the causes of NPL were mainly in the inefficiency of government owned banks and other credit issuing institutions. However, recently, the attention is more focused on the macroeconomic environment in which banks and other financial institutions operate.

NPL have been increasing in the recent past in Nigeria. The increasing level of NPL in the Nigerian Banking system remains a major problem for the economy as well as the main threat to the survival of the banking sector. Though banks have been trying to curb the rising volume of NPL, by increasing interest

rates on the loans and other means, the trend keep increasing. It is against this backdrop that the paper seeks to explore. The objective of this paper therefore is to study and analysis the sensitivity of non PL to macroeconomic factors in Nigeria. In particular, the paper examines the relationship between NPL and several key macroeconomic variables for Nigeria.

This study differs from those reviewed as it is mainly focused on macroeconomic determinants. It will contribute to existing literature by providing evidence on the cause of bad loans in a small developing economy. It may have practical implications for commercial banks, bankers and regulators in the Nigerian economy.

2.0 REVIEW OF RELATED LITERATURE

2.1 Conceptual Framework

The following concepts are clarified as they relate to this work.

- a. **Risk:** This implies a possibility of unexpected outcome. It is the probability of an event occurring between zero and one. As long as profit is a goal, risk is inevitable.
- b. **Risk management:** This is the process of assessing operational dangers of a particular position, measuring its magnitude and mitigating such exposures in order not to deter the institutional goals of the firm (Bank).
- c. **Non-Performing loans:** A loan becomes or is considered non-performing if its payment is 90 or more days late. According to Obamuyi (2007) a loan is non-performing if it's principal and mark-up is not being paid by the borrower in accordance with the agreed terms and conditions of loan payment.

2.2 Theoretical Framework

The theoretical link between NPL and key macroeconomic determinants is the life cycle

consumption model. Louis, Voldis and Metaxas (2011) cited by Farhan, Chandry and Khalil (2012).

According to this model, low income borrowers have higher defaulting risks than high income earners; due to increased risk of unemployment and being unable to pay loan obligations. Furthermore, banks charge higher rates to riskier clients. If a high rate is charged to those borrowers who have a substandard record to repay the loans, it will lead to increase NPL. Accordingly, the probability of default depends on the current income and unemployment rate, which actually is associated with the insecurity of the future income and lending rates.

2.3 Empirical Review

Over the last few years, literature that examines NPL has expanded in line with interest of researchers to understand the factors responsible for financial vulnerability. Keeton and Morris (1987) examined the causes of NPL in US using OLS and showed that local economic conditions explain variations in loans losses by banks.

Khemraji and Pasha (2014) examined the determinants of NPL in Guyana using econometric tools and concluded that macroeconomic variables affect NPL significantly. Meanwhile, Rayan and Dhal (2003) utilized panel regression analysis to report that favorable macroeconomic conditions (GDP, EXR, etc) impact significantly on NPL of commercial banks in Indian economy.

Using panel-based model for countries in sub-Saharan Africa (including Nigeria), Folack (2005) finds evidence that economic growth, exchange rate, real interest rate are significant determinants of NPL in these countries.

Using OLS regression, Farhan *et al.*, (2012) examined the economic determinants of NPL in Pakistan and concluded that such variables as interest rate, inflation, unemployment exert a positive impact on NPL in Pakistan.

Writing on the analysis of NPL on the Albania, Shingjeryl (2013) utilized OLS regression analysis methodology and concluded that real effective exchange rate is positively related to NPL in Albania.

Writing on the determinants of NPL in Malaysia, Adebola *et al.*,(2011) used the ARDL model approach of analysis and found that interest rates, industrial production index and producer price index exhibit positive relationship with NPL in Malaysia.

The study of Akinlo and Emmanuel (2014) investigated the determinants of NPL in Nigeria for 15years. The result should negative relationship

between economic growth and NPL while unemployment and exchange rate exerts positive relationship with NPL.

In a study by Inekwve (2013) using person correlation analysis, it was discovered that gross domestic product is positively related with NPL in Nigeria for the preview 1995-2009.

3.0 METHODOLOGY AND DATA SOURCES

Data was sourced for statistical bulletins of the central bank of Nigeria for the period 1982 – 2015. In order to computer the variable, data was converted to natural logarithms. To exams the macroeconomic determinants of non-performing loan in Nigeria, equities I below is prefixed and started as follows.

$$NPL = \beta_0 + \beta_1 INF + \beta_2 GDP + \beta_3 MOS + \epsilon_t$$

Where NPL is non-performing loan,

INF is inflation,

GDP is Gross Domestic Product,

MOS is the Money Supply and

ϵ_t is the error term

On a priori expectations, we expect the following:

$$B_1 < 0 \text{ or } B_1 > 0$$

$$B_2 < 0$$

$$B_3 > 0$$

To estimate the above equation, the study made use of error correction methodology.

4.0 PRESENTATION AND ANALYSIS OF DATA

This section begins with descriptive statistics presented as below;

Table 1: Descriptive Statistics

	NPL	INF	GDP	MOS
Mean	89.0182	19.13961	5.12338	6242.14
Median	75.0000	11.90000	5.980000	699.2000
Maximum	491.400	78.30000	11.36000	42323.00
Minimum	23.7000	0.20000	-0.690000	18.10000
Std. dev	1576.127	19.69100	3.032033	10951.66
Sternness	1.62740	1.643189	0.037916	2.054166
Kurtosis	3.99101	4.575052	2.46424	6.328248
Jarque-vera	15.91940	18.25148	0.402573	38.43853
Probability	0.000349	0.000108	0.817678	0.00000
Sum	29588.60	631.600	169.0700	20599.9

Sum sq. dev	75493620	12407.92	294.1831	3.8409
Observations	23	23	23	23

The variables are non-performing loans, (NPL), inflation rate (INF), gross domestic product (GDP) and money supply (MOS). The mean of these variables are 89.0+ 19.1, 5.1 and 62.4 respectively. The standard deviation, however for the variables are respectively 1576, 19.7, 3.0, and 109.5. In order to check the time series properties of the variables we apply the Augmented Dickey Fuller (ADF) unit root test to investigate the order of integration of the variables in the model the result is as dear below:

Table 2 ADF Unit Root Test

Variable	ADF	5% value	Remark
NPL	-6.73272	-2.99807	1(1)
INF	-4.49823	-2.97181	1(1)
GDP	-7.45456	-2.96041	1(1)
MOS	-11.48546	-2.9658	1(1)

The results show that NPL, INF, GDP and MOS are all stationary at first difference meaning that the variables are integrated of order 1(1).

Given these properties of the variables, we proceed to establish if there is a long run co-integration relationship among the variable by using the Johansen co-integration technique. In order to determine the both, the trace and maximum-Eigen value testing using the critical value of Mackinon-Haugh-Michelis (1996) was applied and the result of which is displayed below

Table 3: Johansen Co-integration Test Result.

Unrestricted Co-integration Rank Test (Trace)

Hypothesized No of C.E.S	Eigen value	Trace statistic	0.05 critical value	Prob.***
None *	0.71098	68.3829	47.8561	0.000
	3	8	0	2
At most 1 *	0.45519	33.6824	29.7907	0.001
	1	8		7
At most 2 *	0.28969	16.6824	15.4897	0.003
	9	8	1	0
At most 3 *	0.22410	7.10461	3.84149	0.007
	4	9		7

Trace test indicates 4 co-integrating equation at 0.05% * denotes rejection of the hypothesis at 0.05 level. *** Mackinon-Haug - Michel's (1999) p. values

Unrestricted co-integration rank test (maximum Eigen value)

Hypothesis no. of C.E	Eigen value	Max. Eigen	0.05 cortical	Prob.***
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	value				
None *	0.710983	34.559555	27.58434	0.0052	
At most 1	0.455191	17.00495	21.13162	0.1718	
At most 2	0.289699	9.577864	14.25450	0.2412	
At most 3*	0.224104	7.104619	3.841461	0.0077	

Maximum Eigen value test indicate 2 co-integration equations at 0.05 * indicates rejection of the hypothesis at the 0.05 level. *** Mickinon-Hang-Michelis (1999) P- values.

As can be seen above, the two tests identify the existence of four and two co-integrating relationships among the variables in the model at 5 percent level of confidence respectively. The conclusion drawn from the result shows that there exist a stable long-run relationship among NPL and the macroeconomic determinants, GDP, MOS and INF.

Table 4: Long Run Results.

Co-integrating coefficients

Cointeq1

NPL(-1)	INF(-1)	GDP(-1)	MOS(-1)
1.0000	1.44007	28.7781	2.77024
	(1.55987)	(12.42511)	(0.01162)

From table above we derive a long run co-integration equation among non-performing loans, gross domestic price growth, and inflation and money supply, the co-integrating vector is therefore

$$NPL = -1.4INF - 28.7GDP - 2.77MOS$$

In the long run an increase in the inflation rate will lower the incidence of non-performing loans as can be seen from the results. However, contrary to apriority expectation, the coefficient of money supply is negative.

Short-run Analysis: Vector Error Correction Model (VECM)

A co-integrated set of time series variables must have an error correction representation which reflects the short run adjustment mechanism (Englama *et al.*, 2010).

From the Vector Error Correlation Model results, a short run model is estimated as reflected below;

Table 5: Short Run Model

Error Correction	D (INF(-1))	D(GDP(-1))	D(MOS(-1))
0.2627	-0.76292	0.24346	2.7864
(0.027)	(2.8692)	(3.53443)	(1.7876)
[-2.3962]	[0.11233]	0.16355]	[0.0186]

The result of the short run analysis show that all the variables are negatively related or impact negatively on the Non-Performing loans in Nigeria except money supply.

The coefficient of inflation is negative. This means that high inflation enhances the capacity of the borrowing public by reducing the real value of outstanding debt portfolio (Akinlo, 2014). By implication, a one unit increase in inflation reduces NPL by 0.77 units.

GDP is negatively signed in line with Khenaraj and Pasha (2009), Beck, Jacobik and Piloui (2013). GDP growth is expected to increase national income which leads to an enhancement in nonperforming loans payment. In the long run, this tends to lower the incidence of bad loans.

The coefficient of money supply is positive in line with economic expectations. An increase in money supply will have adverse on non-performing loans at least in the short run.

The sign of the error correction parameter in the model is as expected and significant. The sign of the coefficient of error correction is a negative. A value of -0.26 suggests that the system will converge towards its long run equilibrium within 26 months after a shock have occurred.

5.0 SUMMARY AND RECOMMENDATION

This work has shown that in Nigeria, like some other economies, there is a significant relationship between NPL and some macroeconomic variables at least in the short run. However, in the long run, money supply is shown to be negatively related with non-performing loans in Nigeria.

To minimize, the incidence of NPL, the authorities should create encouraging environment to further improve on the nation's GDP.

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