**Bank specifics and macroeconomic factors and non performing loans in Nigerian deposit money banks**

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***Abstract***

*This study investigated bank specific and macro-economic factors as it affects non performing loans in the deposit money banks in Nigeria. Our sample consist eleven deposit money banks listed on Nigeria Stock Exchange and the data covered the period between 2015 and 2020. Panel data were employed, with non performing loans standing as the dependent variable and the independent variables consist of bank specific which were proxied by return on equity, capital asset ratio, cost efficiency, and bank size also; macro-economic variables were annual growth rate of GDP and annual inflation rate. Panel regression econometric model was employed to analyse the data. The result of the data analysis revealed that return on equity and cost efficiency ratios are negatively correlated and statistically significant to non performing loan while, capital asset ratio and bank size are positively related and statistically insignificant to non performing loan. The macroeconomic variables of gross domestic products, growth rate and annual inflation rate also have positive and statistically significant relationship with non performing loans. This study therefore concludes that banks with huge assets should create an expansion strategy for their assets portfolio.*

**Keywords**: Banks specific factors; Macroeconomic factors; Non performing loans.

**Introduction**

Banks play key roles in economic development of any nation. This is because they mobilise funds from surplus units as deposits and lend it to deficit units as loans for investment activities. When banks give out funds to deficit units to finance it activities they are exposed to credit risk. That is banks are faced with possibility of customers not being able to pay back the loans lent to them.

A great level of non-performing loans (NPL) can have a very severe financial consequence on a given bank or even the entire banking system. This is confirmed by studies of (Demirguc-Kunt 1989 and Whalen 1991 in Messai and Jouini 2013) which revealed that the reasons behind bank and thrift failures were preceded by a large level of non-performing loans and that insolvency can statistically be predicted by asset quality. Therefore, it is pertinent for bank managers and regulators to understand what can lead to high loan losses by banks.

This paper investigates bank specifics and macroeconomic factors that can lead to non performing loans amongst listed banks in Nigeria.

**Literature review**

Bad luck, bad management and skimping hypotheses as likely causes of non performing loans in the banking industry was developed by Berger and DeYoung (1997) while moral hazards hypothesis was developed by Keeton and Morris (1987).

The bad luck, bad management and skimping hypothesis was based on the outcome of the study of causes of non-performing loans of United States of America commercial banks between 1984 -1994. The research work studied the relationship between NPL and cost efficiency and capitalization of US commercial banks. The research result indicates that there are two- ways causality between NPL and cost efficiency. These two-ways causality resulted in two hypotheses; bad management and bad luck.

The researchers posit that bad luck hypothesis arises when causality is from NPL to low cost efficiency. This is reflected by high level of non-performing loans which is driven mainly by exogenous factors like collapse of an industry, government policy and bad macroeconomic environment. A good case study was the adverse effect of the collapse of international crude oil price on oil and gas credit portfolio of Nigeria commercial banks. Bad macroeconomic environment such as high unemployment rate, hyper-inflation, negative GDP growth rate may adversely upset the level of non-performing loans.

Bad management hypothesis arises when causality flow from high cost efficiency to NPL. This hypothesis states that management practice of cost saving in order to declare impressive bottom line in short run by not allocating adequate resources to acquire and trained staff with requisite skills to adequately evaluate credits before it is underwritten, monitored and control the credit disbursement may likely result in an increase in level of non-performing loan.

Skimping hypothesis as alternative hypothesis as suggested by Berger and De Young (1997) states that a positive causality between high cost efficiency and NPLs can exist. The researchers posit that due to low resource allocated to monitoring of credit, higher loan default may result which would lead to spike in the level of non-performing loan.

Moral hazard hypothesis as proposed by Keeton and Morris (1987) states that banks that have small capital base are likely to underwrite high risk loan in response to their poor capitalisation. This poor loan portfolio shall result in great level of non performing loans.

Berger and De Young (1997) investigates the causality between non-performing loans, cost efficiency and capitalisation among commercial banks in US in the period 1984-95 and ordinary least square techniques were applied to the annual observations. The result of Granger- Causality test shows that there are inter temporal connections cost efficiency run and loan quality.

Chaibi (2016) examined the determinants of problem loan in commercial banks in Tunisia. Panel data were collected from ten commercial banks listed on Tunis Stock Exchange between 2001 and 2010. The study only checked for bank specific indicators that may determine non performing loans. The result showed that credit risk rate and loan quality which are differently influenced by bank size and capitalization can be determined by bank profitability and cost inefficiency.

Koju, Koju and Wang (2018) evaluated the macro-economic and banks’ specific factors of non performing loans in Nepalese banking system. Data of thirty commercial banks operating in Nepal were collected over a period of 2003 and 2015. The impact of seven bank specific and five macro economic variables were tested on non performing loans. Export to import ratio showed a positive significant relationship with NPLs while cost efficiency and asset size both reveal a negative relationship in relation to GDP growth rate, capital adequacy, and inflation rate.

Bayar (2018) investigated the impact of macro-economic, institutional, and bank specific factors on non performing loans of commercial banks in developing market economies between 2000- 2013 using the system general movement dynamic panel data estimator. The finding reveals that non performing loans are negatively affected by fiscal growth, inflation, regulatory capital to weighted assets, institutional development, non-interest income to total income, equity and return on asset but lagged values of non performing loans, unemployment, cost to income ratio, public debt, financial crises and credit growth affect non performing loans positively.

Hosen, Broni, and Uddin (2020) studied the effect of banks specific and macro-economic factors on NPLs in Bangladesh. Annual panel data of best 26 conservative banks and 4 Islamic Bangladesh banks were collected between 2014 and 2018. The study adopted pooled OLS technique was used to analyse the data. The result indicates that cost efficiency shows a positive significant effect on NPLs of which loan to deposit ratio shows a negative influence on non performing loans. Also a positive but statistically insignificant relationship was revealed between capitalization, economic growth bank size and non performing loans.

Haniifah (2015) examined the economic factors of NPLs in banks listed on Ugandan stock exchange. The data of all twenty five commercial banks in the country were collected in the period between 2000 and 2013. A multiple linear regression model was employed the findings show that the relationship between inflation, interest and GDP growth rates and NPLs is negative and statistically insignificant while the relationship between interest rate and NPLs is positive but also statistically insignificant.

Rajha (2016) investigated banks specific and macro-economic factors that may influence non-performing loans (NPLs) in commercial banks in Jordan. The researcher employed an exclusive annual dataset that encompassed all periods between 2008 and 2012 and used regression model to analyse the data collected. The finding reveals that non-performing loans in Jordanian banking sector were greatly and significantly affected by the ratio of loans to total assets and the lagged non-performing loans.

**Variables Defined**

This research work examines the influence of both banks specific and macro-economic factors on non-performing loans among deposit money banks in Nigeria. The banks specific factors that are included in our econometric model are; profitability which is measured by return on asset, bank capital measured by capital asset ratio, bank size measured bank total asset, bank cost efficiency measured by bank operating expense over total income. The macroeconomic factors we considered in this work are gross domestic products (GDP) which is measured by annual GDP growth rate and inflation rate measured by annual inflation rate.

**Bank Profitability**

The level of profitability of a bank may influence its risk taking behaviour. A highly profitable bank may not be under pressure to grant credit to high risk customers. Consequently, such bank may have very low non-performing credit. However a bank that is struggling to make profit may engage in risky credit undertaken to shore up its profit. Therefore, such a bank is likely to be burdened with high level of problem loan. A negative relationship between bank profitability and non performing loan is expected from this.

In this study, we used return on equity as proxy for profitability. This is a representation of the rate of return expected from equity invested in banks; it is a measure of how much profit a bank can generate from the shareholders money they have invested.

**Capital Adequacy Ratio**

Capital adequacy ratio is used to quantify the financial soundness of a bank. There is a global metrics to measure financial strength and soundness of banks and is called Basell 1 and 2. This bank capital metrics is now used as regulatory benchmark to control and monitor banks by Central Bank of Nigeria. It is a measure of banks’ solvency and capacity to absorb risk. Thus, this ratio is employed to guard depositors and stimulate steadiness and competence of financial systems. A well capitalised bank is expected to have to less incentive to underwrite risky credit. However earlier studies indicate both positive and negative relationship between bank and non-performing loan.

**Bank Size**

Large banks are expected to have enough resource in term of managerial skills and experience to thoroughly vet credit application such that only customers with good credit standing shall be granted loan. In addition to that, they are also expected to be equipped with ability to monitor their credit until it is fully paid. Because of this, big banks are mostly less exposed to credit risk. Small banks are likely to face shortage of resources which may affect their ability to properly evaluate credits before they were granted and monitoring after disbursement which may result in high level of large problem loans.

**Cost Efficiency**

Increase in operating cost may encourage lenders to acquire risky assets to counter cost spike in order to improve their bottom-line. However, banks that keep operating cost under control are likely to be more profitable and would not have incentive to engage in risky lending.

**Macroeconomic Factors**

The macroeconomic factors like rate of growth of the economy, inflation, exchange unemployment and interest rates can also have effects on level of NPL.

The impact of level of GDP growth rate can be obvious because an increase in growth rate of GDP implies more income for consumers. This means that borrowers shall have more income, hence their ability to meet financial obligation to their lenders is enhanced and problem of high level of nonperforming loan for banks are minimised. On the other hand if there is deceleration in GDP growth, income of the consumers will be reduced hence the ability of borrowers to meet their financial obligation to the lenders shall be curtailed.

In period of high inflation rate, income of consumers is reduced because the same amount of money cannot buy the same quantity of goods and services as it used to be in the past. Because of the reduced income, there is likely to be default in loan repayment by borrowers especially consumer credit obligations. In nations where loan rates are flexible, higher inflation may give rise to higher rates which might have resulted from monetary policy actions at combating inflation (Nkusu, 2011)

Interest rate is the cost borrowers pay for the use of credit fund. When lending rate is based on variable interest rate a change in rate interest may influence the level of nonperforming loan. An increase in leading rate would increase the cost of credit and may lead to increase in default rate by the borrowers, hence higher level of nonperforming loan. Similarly, a decrease in lending rate makes cost of fund cheaper, therefore, reduces possibility of spike in non-performing loans.

**Data collection and model specification**

The sample size of our work consists of eleven listed deposit money banks in Nigeria that were judgmentally selected based on non-probability sampling technique. The population of listed deposit money banks on the Nigeria Stock Exchange is thirteen as at December 2021.

The data for this study covered the period between 2015- 2020. Data was collected from the financial statements of the sampled banks from their respective websites and Central Bank of Nigeria (CBN) Statistical Bulletin. The bank specific variables were extracted from statements of profits and loss accounts and statement of financial position of the banks. While the macroeconomic variables were extracted from CBN annual statistical bulletin.

Our empirical model specification is adopted from the works of (Chaibi, 2016; Berger & De Young, 1997)

The econometric model is as follows

NPLit = α+∆β1ROEit + ∆β2CARit +∆β3SIZEit +∆β4EFFit + ∆β5GDP + +∆β6INFL + ε

Where:

The subscripts i and t represents the cross sectional and time dimension of the panel sample respectively and;

NPLs; *Non performing loans= Classified loan/Gross loan*

ROE: *Return on Equity = Profit after tax/Total equity*

CAR: *Capital Asset Ratio = Equity capital/Total assets*

SIZE: *Bank Size: = Natural log of total assets*

INEF: *Cost inefficiency = Operating expenses/Operating income*

GDP: *Gross Domestic Product = Annual GDP growth rate*

INFLA: *Inflation Rate = Annual inflation rate*

ε = *error term.*

**Analysis of result and discussion of findings**

Table 1 shows the descriptive statistics with the values of all the variables in our regression model. Nonperforming loan (NPL) has minimum ratio of 1.70 and maximum of 24.40 and standard deviation of 4.48. Return on equity (ROE) minimum ratio is 2.70 while maximum is 34.50 with standard deviation of 8.43. Capital asset ratio minimum is 11.01 and maximum is 27.00 with standard deviation of 3.69. Cost Efficiency shows a minimum ratio of 37.09, maximum ratio of 89.90 with a standard deviation of 12.66. GDP growth rate shows a minimum ratio of -1.79, maximum ratio of 2.65 with a standard deviation of 1.81. Inflation rate shows a minimum ratio of 9.55, maximum ratio of 16.50 with a standard deviation of 2.36. Size shows a minimum ratio of 11.59, maximum ratio of 12.93 with a standard deviation of 0.33

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| **Table 1 Descriptive Statistics** | | | | | |
|  | N | Minimum | Maximum | Mean | Std. Deviation |
| NPL | 66 | 1.70 | 24.40 | 6.1171 | 4.48389 |
| ROE | 66 | 2.70 | 34.50 | 14.5132 | 8.43364 |
| CAR | 66 | 11.01 | 27.00 | 18.9530 | 3.69814 |
| Cost Inefficiency | 66 | 37.09 | 89.90 | 63.8977 | 12.66426 |
| GDP growth rate | 66 | -1.79 | 2.65 | .6298 | 1.81727 |
| Inflation rate | 66 | 9.55 | 16.50 | 13.1008 | 2.36650 |
| Size | 66 | 11.59 | 12.93 | 12.3636 | .33970 |
| Valid N (listwise) | 66 |  |  |  |  |

Table 2 show the result of R squared to be 0.410 and Adjusted R squared to be 0.350. This indicates that about 40% of disparity in non performing loans is caused by the effects of the bank specific and macro-economic variables in the econometric model.

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| **Table2 ANOVAa** | | | | | | |
| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
| 1 | Regression | 557.513 | 6 | 92.919 | 7.316 | .000b |
| Residual | 749.332 | 59 | 12.701 |  |  |
| Total | 1306.845 | 65 |  |  |  |

a. Dependent Variable: NPLs

**Table3 COEFFICIENTSA**

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| Model | Unstandardized Coefficients | | Standardized Coefficients | | T | Sig. |
| B | Std. Error | Beta | |
| 1 | (Constant) | -1.868 | 21.888 |  | -.085 | .932 |
| ROE | -.385 | .072 | -.724 | -5.345 | .000 |
| CAR | .002 | .003 | .072 | .679 | .500 |
| Cost Inefficiency | -.194 | .055 | -.547 | -3.521 | .001 |
| Size | 1.435 | 1.558 | .109 | .921 | .361 |
| GDP growth rate | .714 | .310 | .289 | 2.301 | .025 |
| Inflation rate | .586 | .241 | .309 | 2.432 | .018 |
| a. Dependent Variable: NPLs | | | | | | |

**Regression Result**

Table 3: The result indicates that return on equity (ROE) is negatively related to non-performing loans (NPLs) but it’s statistically significant. This implies that as the profitability of banks increases while the level of NPLs of sampled banks decreases. This result is in line with theory that profitable banks would not be under pressure to underwrite a risky loan. These findings are in line with studies of Bayar (2018) and Chaibi (2016).

The result of the regression also shows that capital asset ratio is positively related to non performing loans but statistically insignificant. This finding is in conformity with the study of Hose et al (2020) which found positive and statistical insignificant relationship between bank capitalisation and NPLs. However, the studies of Koju et al 2018 and Bayar (2018) found negative and statistical significant between NPLs and bank capitalisation.

The cost efficiency has negative but statistically significant relationship with NPLs. This is in line with the theory of bad management as proposed by Berger and De Young (1997). This result is in tandem with the findings of Berger and De Young (1997) and Hose et al (2020).

Bank size shows a positive but statistically insignificant relationship with NPLs as reflected in which is similar to the study of Hose et al (2020) which found a positive and statistically insignificant relationship between bank size and NPLs. In the same vain, Koju et al (2020)’s study of Nepalese Banking sector and non-performing loans revealed that bank size has a positive but insignificant relationship with NPLs in Nepal.

The growth rate of gross domestic product is positive and statistically significant to NPLs in our regression result, the positive relationship between GDP growth rate and NPLs is unexpected based on theory. This result is contrary to findings of Yilmaz (2018) and Koju et al (2018) that found negative and statistically significant relationship between non-performing and GDP growth rate.

The inflation rate also reveals a statistically significant positive relationship with non performing loans. This is in line with aprior expectation. However, this is contrary to the result of Hanifah (2015) which reported a negative relationship between non-performing loans and inflation rate in Uganda.

**Conclusion and Recommendations**

The findings from our study reveal that both banks specific and macroeconomic factors affect non performing loan of deposit money banks in Nigeria. In specific terms, return on equity and cost efficiency reflects a statistically significant negative relationship with NPLs, while capital asset ratio and bank size has positive and insignificant relationship with NPLs. Similarly, the two macroeconomic factors that were employed in our model indicate that both were positively correlated with non-performing loan and were also statistically significant.

It is therefore recommended that banks should have a tighter lending/credit policy because a looser policy will decrease banks’ bargaining power. Banks which have small capitalization ratio should avoid excessive risk taking. And lastly, banks with huge assets should create an expansion strategy for their assets portfolio.

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