International Journal of Social and Educational Innovation
Vol. 11, Issue 21, 2024
ISSN (print): 2392 – 6252
eISSN (online): 2393 – 0373
DOI: 10.5281/zenodo.14720969

RELATIONSHIP BETWEEN BANK CREDITS AND MACROECONOMIC FACTORS IN NIGERIA

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Abstract

Credit risk management is a very difficult and complex task in the financial industry due to unpredictable nature of the macroeconomic factors coupled with the various microeconomic variables which are peculiar to the banking industry or specific to a particular bank. The paper attempts to determine the association between bank credits and macroeconomic factors. The study seeks twofold aims: First the paper shows the relation between performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. Second, the paper shows the relation between non-performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. For achieve the aim, the study applied a simple correlation framework to assess the direction and extent and test the significance of the relationship between the considered macroeconomic variables and both performing credits and non-performing credits. The findings detail the determinants of nonperforming and performing credits of commercial banks in Nigeria shall be beneficial to different stakeholders in the banking sector (Deposit Money Banks and micro finance banks), monetary authority (Central Bank of Nigeria) and researchers. The findings shall also be used as definite inputs in developing regulatory standards regarding the lending policies of Deposit Money Banks in Nigeria. This study shall sensitize the deposit money bank management to give due emphasis to the management of these identified variables and provide them with further understanding of activities that can enhance their loan performance.

Keywords: ***bank credits, risk management, macroeconomics. Nigeria, loan performance.***

1. Introduction

The business of banking has to do with lending which also involves the risk that the borrowers may not pay back the loan as promised, and paying a fixed rate of interest on term deposits. This involves the risk that lending rates will drop, leaving the bank earning less on its investments than it is paying out on deposits. In this study, we attempt to identify the nature of sensitivity of bank performing and non-performing credit and macroeconomic factors in Nigeria. Explicitly, the focus of the study is on macroeconomic and bank specific variables as determinants of banking sector development in Nigeria.

Credit risk management is a very difficult and complex task in the financial industry due to unpredictable nature of the macroeconomic factors coupled with the various microeconomic variables which are peculiar to the banking industry or specific to a particular bank. There are various strategies of addressing the problem of instability and efficiency. This work attempts to establish the effect of macro-economic variables and bank specific factor on bank performing credit/loan and nonperforming credit/loan in Nigeria.

Banks grant loans and advances to individuals, business organizations as well as government to enable them to undertake investments and other development activities as a means of contributing towards the economic growth in general and aiding economic development in particular. But in the process, loan defaults result from low quality of assets, high non-performing credits that account for losses and a reduction in bank profitability. NPCs hamper economic growth and reduce efficiency. Banks and the financial system generally experience shock, and these can arise from factors specific to the bank or macroeconomic conditions. Against this background, this work will evaluate the determinants of non-performing credits in commercial banks of Nigeria. It will investigate long run and short run causality flow from macroeconomic factors and bank specific to bank performing and nonperforming credit. Over a period of 36 years, that is 1981 to 2017 which is very critical in Nigerian banking history, banks and financial institutions in a country act as intermediaries between surplus unit (supply side) and deficit unit (demand side) of fund. Nigeria's financial system is a conglomerate of various markets, instruments, operators, and institutions that interact within the economy to provide financial services. Nigeria, with her versatile financial system comprises 2991 bureau de change, 21 commercial banks, 6 development finance institutions, 5 discount houses, 64 finance Companies, 5 merchant banks, 942 micro-finance banks, 1 non-interest bank, and 36 primary mortgage institutions (CBN, 2016). Developing the financial sector, therefore, became an important development target for countries. Awojori and Amel (2011) posit that banks'

objectives are closely related to profitability, growth in assets and customer base. Banks grant loans and advances to individuals, business organizations as well as government in order to enable them undertake investments and other development activities as a means of contributing toward the economic growth in general and aiding economic development in particular. But in time of economic recession, loan default could be more rampant resulting from low quality of assets, high non-performing risk assets (credit risk) that may result in huge loan losses and thus reducing bank profitability. However, if such assets do not generate any income, the banks` ability to repay the deposit amount on the due date would be in jeopardy. Therefore, banks with such asset would become weak and such weak banks will lose the faith and confidence of their customers. Ultimately, unrecoverable amounts of loans are written off as non-performing loan (Mallick, Rakov, Ngin, Gamerota, Pilkey, Hill, Uman, Jordan, Nag & Said; 2010). Thus, since nonperforming- loans have an adverse effect on the banking sectors survival, the cause for NPLs should be given due consideration. In the Nigerian financial system, non-performing Credits (Npc's) refer to loans which for a relatively long period of time do not generate income. This implies that the principal and or interest on these loans have been left unpaid for at least 90 days (Caprio & Klin-Gebiel, 1999). NPLs have become a critical issue of discourse in finance literature because of the close link between banking crises and massive accumulation of it. Its causes vary in different countries, which might be due to situational factors such as the level of economic condition in which the banking sectors are operating and also bank level factors. Macroeconomic variables are external determinants of credit assets quality. The banks' specific policies and there qualities, staff quality, morale, asset management mechanisms and so on are internal drivers of banking performance.

The banking sector in Nigeria has faced a lot of problems, the most destructive problems is the huge and ever-increasing amount of NPLs which has influence on the banks' efficiency and growth. This as well endangers the growth and development of the Nigerian economy. The magnitude of nonperforming loans in Nigeria increased from N260.19 billion as at end December 2003 to N2.9 trillion as at end of December 2009. It then reduced to N649.63 billion at the end of December 2015 (CBN, 2016).

Some studies, including Ali and Iva (2013), Benyah (2010), Yu and Gan (2010) investigated bank credits and macroeconomic factors. Benyah (2010) showed trade openness is important in explaining financial intermediary development, and financial openness negatively influences financial development. Saba et al. (2012) revealed that real total loans have positive significant effect whereas interest rate and GDP per capital had negative significant association with NPLs.

Carlos (2012) found that inflation rate had insignificant effect on non-performing loans (NPLs) in Spain and Italy. Selma and Jouini (2013) found out that GDP growth rate, unemployment rate and real interest rate had positive significant effect on NPLs. Makri et al. (2014) found real GDP growth rate, ROA and ROE had negative relationship whereas lending, unemployment and inflation rate had positive significant effect on NPLs.

The paper attempts to determine the association between bank credits and macroeconomic factors. The study seeks twofold aims: First the paper shows the relation between performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. Second, the paper shows the relation between non-performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. For achieve the aim, the study applied a simple correlation framework to assess the direction and extent and test the significance of the relationship between the considered macroeconomic variables and both performing credits and non-performing credits.

The findings detail the determinants of nonperforming and performing credits of commercial banks in Nigeria shall be beneficial to different stakeholders in the banking sector (Deposit Money Banks and micro finance banks), monetary authority (Central Bank of Nigeria) and researchers. The findings shall also be used as definite inputs in developing regulatory standards regarding the lending policies of Deposit Money Banks in Nigeria. This study shall sensitize the deposit money bank management to give due emphasis to the management of these identified variables and provide them with further understanding of activities that can enhance their loan performance. The study reminders include Section 2 which surveys past literature, Section 3 which provide highlights on the method, Section 4 which presents the results and Section 5 presents the conclusions.

2. Literature

Macroeconomic variables that affect banks activities have been identified as part of external environment. İslamoğlu (2015) opined that money supply, interest rate and established that decrease in interest rate causes an excessive loan growth in the long run and increases non-performing loans. Jakubik and Reininger (2013) using data from Central Eastern and Southeastern European (CESEE) countries (Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania, Russia, Slovakia, and Ukraine), observed that in addition to factors identified above that nation's exchange rate has a strong relationship with bank activities. Other Scholars

(Badar and Javid; 2013, and Akinlo and Emmanuel, 2014) agreed that there is significant relationship between macroeconomic variables and banks activities of given loans but the effect on performing and nonperforming credits has not been established.

Thi Minh Hue (2015) identified bank specifics as factors that could influence bank's activities. He discovered that growth rate of loans, the total assets of banks, have impact on NPC. Other authors such as (Kirui (2014), Hu, Li, and Chiu (2006) and Godlewski (2005); all identified Capital adequacy, Management practice and Liquid ratio as the most significant of these factors.

Crouhy et al. (2000) and Tanasković and Jandrić (2015) concluded that the range of non-performing loan is influenced by both macroeconomic factors which they termed a systematic risk and bank-specific factors (an unsystematic risk). Other authors have linked macroeconomic variables with capital adequacy ratio, the return on equity and credit risk in banks.

The relationship between financial development and economic growth has been explained by researchers using both firm level and industry level data across the board, in a cross-section of countries. Makri, et al. (2014) identified the factors affecting NPLs of Euro zone's banking systems for 2000-2008 periods before the beginning of the recession. The study includes 14 countries as a sample out of 17 Euro zone countries. The variables included were growth rate of GDP, budget deficit (fiscal), public debt, unemployment, loans to deposits ratio, return on assets (ROA), and return on equity (ROE) and capital adequacy ratio. This study utilized difference Generalized Method of the Moments (GMM) estimation and found real GDP growth rate, ROA and ROE had negative relationship whereas lending, unemployment and inflation rate had positive significant effect on NPLs. However, ROA and loan to deposit ratio, inflation, and budget deficit did not show any significant impact on NPL ratio.

Carlos (2012) on macroeconomic determinants of the non-performing loans (NPLs) in Spain and Italy found inflation rate had insignificant effect on NPLs. Selma and Jouini (2013) conducted a study on three countries namely Italy, Greece and Spain for the period of 2004-2008 to identify the determinants of NPLs for a sample of 85 banks. The variables included both macroeconomic variables (GDP growth rate, unemployment rate and real interest rate) and bank specific variables (return on assets, loan growth and the loan loss reserve to total loans). It was found out that GDP growth rate, unemployment rate and real interest rate had positive significant effect on NPLs. However, ROA, loan growth and the loan loss reserves to total loans did not show any significant impact on NPL ratio.

Benyah (2010) investigated determinants of financial intermediary development in all African countries, by making use of cross-sectional data and panel data techniques, for the period of 1975-2006. Financial intermediary development is quantified by a banking sector indicator, liquid liabilities (M^3), while the explanatory variables were trade openness, financial openness and GDP growth rate. Trade openness is measured as sum of exports and imports, as a ratio of GDP, and financial openness is measured as sum of foreign assets and liabilities as a ratio of GDP. The cross-sectional regression results showed that there is a positive relationship between trade openness and financial intermediary development. GDP growth rate and financial openness were not statistically significant in explaining financial intermediary development. Panel regression results also showed trade openness is important in explaining financial intermediary development, and financial openness negatively influences financial development. The GDP growth rate is insignificant.

Saba et al. (2012) also investigated the bank specific and macroeconomic variables of nonperforming loans in the US baking sector from 1985 to 2010 period using OLS regression model. They considered total loans, lending rate and Real GDP per capital as independent variables. The finding revealed that real total loans have positive significant effect whereas interest rate and GDP per capital had negative significant association with NPLs.

Kablam (2010) assessed the determinants of banking system efficiency in Sub-Sahara Africa, and asked what, besides the degree of efficiency, explained the low levels of financial development in the region. The sample the study consisted of 137 banks in 29 African countries for the period between 1998 and 2002. Method of measurement of efficiency was stochastic frontier analysis for cost-effective frontier as well as the generalised method of moments for explaining financial development. The generalized method of moments makes it possible to take into account simultaneity bias and reverse causality by using lagged independent variables as instruments. Variables included for cost-efficiency analysis were the ratio of private loans to GDP, GDP per capita, the share of rural population, as well as capitalization and bank size ownerships. Variables included for financial development were grouped into five categories, and these were market structure of the financial system, macroeconomic conditions, geography and legal tradition of countries, political environment and the regulation of financial system.

Yu and Gan (2010) examined the determinants of banking sector development in Malaysia using real income, real interest rates, trade openness and financial openness as explanatory variables. The study employed three models of banking sector development namely, liquid

liabilities (M3), private sector credit and domestic credit. The analysis was made with ordinary least squares (OLS) method. The findings, were that real income encourages banking sector development. Consistent growth in GDP meant that business entities responded to the demand of goods and services. This cycle will be brought about by increased lending and borrowing activities. The findings also suggested that financial openness have a negative impact on banking sector development.

Ali and Iva (2013) studied the impact of bank specific factors on NPLs in the Albanian banking system. They considered interest rate in total loan, credit growth, inflation rate, and real exchange rate and GDP growth rate as determining factors. They used OLS regression model for panel data from 2002 to 2012 period. The finding reveals a positive association of loan growth and real exchange rate, and negative association of GDP growth rate with NPLs. However, the association between interest rate and NPL was negative but weak.

3. Methodology

3.1. Methods

The paper applies the standard procedure for testing, empirically, the required relationship between variables. The paper first discusses basic statistics including the mean, standard deviation, minimum and maximum to describe the variables, and the Jarque-Bera (JB) statistics to establish the normality or otherwise of the distribution of each considered variable. The statistic, computed from equation (1), represents a goodness-of-fit that confirms whether recovered sample skewness and kurtosis match likely normal distribution.

$$JB\text{-statistic} = 1/6 * [(\tilde{\mu}_3)^2 + 0.25\ (\tilde{\mu}_4 - 3)^2] \quad (1)$$

Where $\tilde{\mu}_3$ and $\tilde{\mu}_4$ are the skewness and kurtosis coefficients. The variable's series is non-normal distribution, if the JB is far from zero, and as such the test is significant.

Afterword, the correlation matrix was presented here to describe the relationship that exists among the variables. Correlation provides direction and strength of the link between covariates. To demonstrate this, the standard procedure is to assume two data pairs (x_i, x_j), with n-set $[(x_{1,1}, x_{2,1}), x_{1,2}, x_{2,2}), \ldots, (x_{1,n}, x_{2,n})]$, and use equation (2) which offers the estimates for the (centered) correlation coefficient (denoted $r_{x_1 x_2}$), where:

$$r_{x_1 x_2} = \sum_i^n (x_{1,t} - \bar{x}_1)(x_{2,t} - \bar{x}_2) \left[\sqrt{(x_{1,t} - \bar{x}_1)^2}\sqrt{(x_{2,t} - \bar{x}_2)^2}\right]^{-1} \quad (2)$$

The estimated coefficient would lie between –1 and +1, with a mid-point at 0, showing the non-existence of linear evidence.

The paper demonstrates the correlation between macroeconomic variables, such as inflation rate (INFR), monetary policy rate (MPR), exchange rate (EXCR), interest rate (INTR) and performing credits (PCR), on one hand), as well as between macroeconomic variables and non-performing credits (NPCR), on the other hand.

3.2. Data

The study uses published data on PL and NPL of deposit money banks (DMBs) in Nigeria between periods of 1981 to 2017. This period considered periods represent era when the banking sector witnessed critical regulations, recapitalization, and mergers. The paper shows the historical evolution of the data by depicting their times series plots. Figure 1 shows the evolution of the performing loan, indicates that performing loans were very low and stable within the period of 1981 to 2000. Thereafter, it increased gradually but fell in 2003. Since the consolidation exercise of 2005, there is evidence of phenomenal increase in performing loan, though the great recession slowed down the speed of this increment. Figure 2 shows the evolution of the nonperforming loan had been increasing gradually from 1981 to 1997, which rose sporadically in 1988, reached a considerable height in 1999 but started declining until it reached the lowest ebb in 2007. However, they increased immediately and reached a peak in 2008. They fell again, but in 2013, there was noticeable and persistent increase in nonperforming loan. Therefore, we can see that nonperforming loan increased astronomically from 2007 to 2008. This period was associated with the period that the Nigerian economy was rocked by the global financial crises. Figure 3 shows the evolution of the domestic prices of goods over the period between 1981 and 2016. Prices were highly unstable. The lowest prices were attained in 1985 and 1999 respectively. In 1989 prices fell drastically and reached a minimum level in 1990. In the same year, it started rising rapidly and reached a peak in 1994. This study noticed that prices fell sharply in 1981, 1996 and 2011 respectively. In essence, it seems that Nigeria has been highly inflationary since 1982.

Figure 4 shows that the evolution of the monetary policy rate initially increased systematically until 1994. It rose up in 1995 and declined again in 1996 to 1999. Since 2001 the rate consistently dwindled till 2017. It reached the peak in 2016 with a value that was 15 percent. Figure 5 shows the evolution of the naira-dollar exchange rates. The exchange rates were stable within the period of 1981 to 1989. It rose gradually from the end of 1989 to 1993 and became stable by 1998. This increased in 2008 and 2014. The most favorable exchange rate regime was the period between 1981 and 1989. Figure 6 shows the evolution of the interest rates. The

lowest interest rate can be traced to 1981, and since then interest rates have been increasing and falling intermittently. The interest rate reached its peak in 1983 but fell immediately. From 2011 to 2016, interest rates increased consistently.

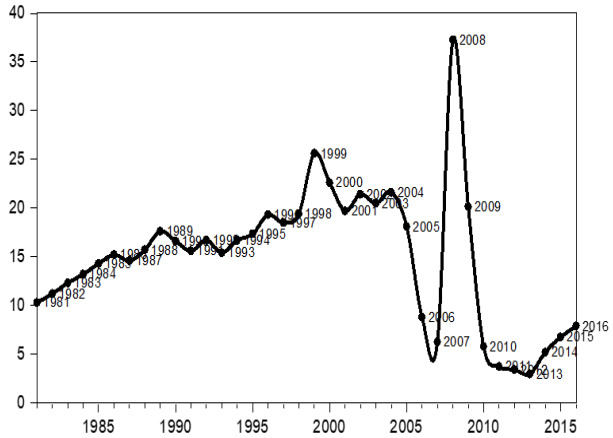

Figure 1: PCR

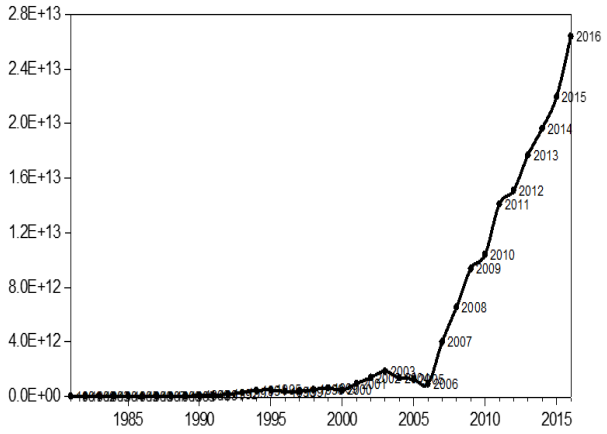

Figure 2: NPCR

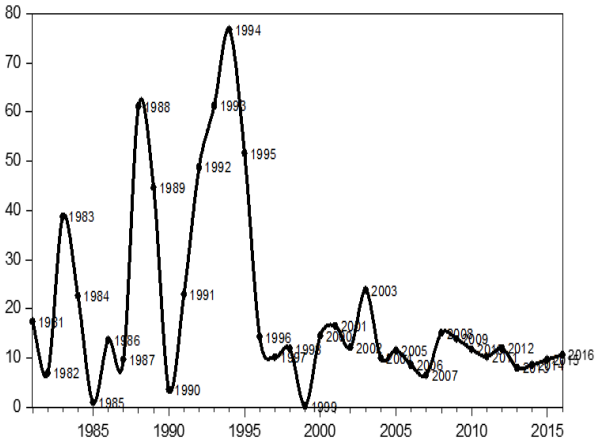

Figure 3 INFR

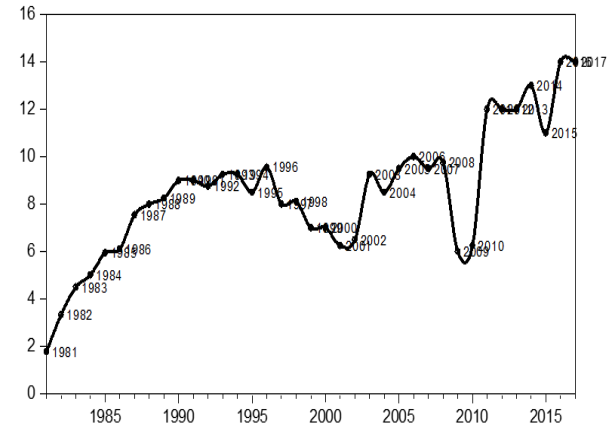

Figure 4: MPR

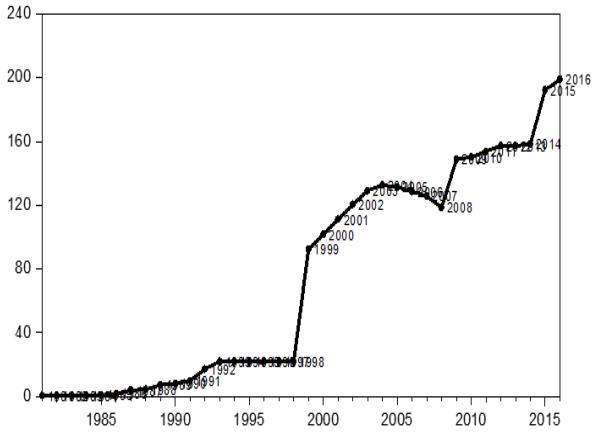

Figure 5: EXCR

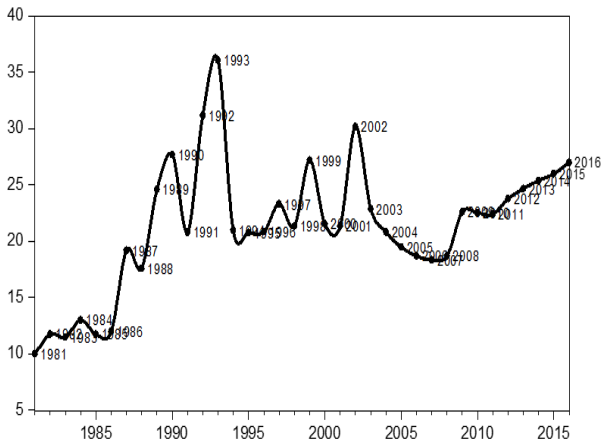

Figure 6: INTR

Note: Figure 1 to 6 are, respectively, the time series plots for Performing credits (PCR), Non-performing credits (PCR), Inflation rate (INFR), Monetary policy rate (MPR), Exchange rate (EXCR), and Interest rate (INTR).

Source: Author

4. Results

Before presenting correlations and the significance of the relations, Table 1 reports show the descriptive information of the variables. The performing credit has an average of 5.12E+12 billion. With a standard deviation of 8.35E+12, the performing credit ranges from 1.58E+10 to 3.85E+13 billion. The variable has a minimum of 0.065121 (6.5%), and a maximum of 0.326364 (32.6%). The nonperforming credit has an average of 14.70045 billion, and with a standard deviation of 7.160114, it ranges from 2.939538 to 32.25329 billion. Although both variables are volatile, and the average of non-performing credits is high, its aggregate value is less than the performing credit. Moreso, the aggregate performing credits increased faster than the aggregate non-performing credits.

The average values of inflation, monetary policy rate, exchange rate and interest rate are 19.56, 8.44, 81.41 and 9.44, respectively. The inflation rate had increased over time with its lowest value at 5.38 and maximum value of inflation at 72.83. The monetary policy rate has increased over-time with its lowest value set at 1.770 and maximum at 14.00. The exchange rates, sporadically increase and ranged from ratio 0.61 to 305.79, during the considered periods. The interest rate has risen with its lowest value at 1.990 and maximum value of inflation at 14.397. Except for the monetary policy rate that is negatively skewed, the coefficient of skewness for the variables are approximately larger than zero, supposing they are positively skewed. Moreso, the kurtosis values are larger than 3 except in case of monetary policy rate and exchange rate. This means that the monetary policy rate and the exchange rate have low volatility of volatility, and they are platykurtic, with a flat tail. While the rest variables `are leptokurtic with high volatility of volatility. This leptokurtic characteristic suggests that in the future time, these variables would manifest high values or there would be occasional outliers in the future.

The probability values associated with Jarque-Bera, with respect to aggregate performing credits, money supply, exchange rate, interest rate and inflation are approximately 0 percent. This signifies that these variables are not normally distributed. On the contrary, the probability values of all these statistics with respect to aggregate nonperforming credits and monetary policy rate are larger than 10 percent. The null that these two variables are normally distributed

cannot be rejected. It is obvious that while nonperforming credits follow a normal distribution, performing credits do not.

Table 1: Sample Statistics

Statistic	PCR	NPCR	INFR	MPR	EXCH	INTR
Mean	5.12E+12	14.700	19.560	8.443	81.414	9.441
Maximum	2.85E+13	37.259	72.830	14.00	305.79	14.39
Minimum	1.58E+10	2.959	5.3800	1.770	0.6100	1.990
Std. Dev.	8.35E+12	7.160	17.696	2.787	81.107	3.782
Skewness	1.569	0.539	1.6693	-0.012	0.7603	0.011
Kurtosis	4.1409	4.058	4.5355	2.994	2.897	3.146
Jarque-Bera	16.736	3.427	20.258	0.001	3.484	0.033
Probability	16.737	0.181	0.0004	0.999	0.175	0.981

Note: Performing credits (PCR), Non-performing credits (PCR), Inflation rate (INFR), Monetary policy rate (MPR), Exchange rate (EXCR), and Interest rate (INTR).

Source: Author

Table 2 shows the correlation matrix. The evidence indicates that except the inflation rates, all considered macroeconomic factors, including monetary policy rate (MPR), exchange rate (EXCR), and interest rate (INTR), has positive relationship with performing credits (PCR). Although negative, the correlation coefficient of -0.0168 between inflation and performing credit is very low and nonsignificant. The p-value of 0.4285 associated with the relationship between inflation and performing credit is more than 0.05, indicating that the null for the test is refuted at 5%.

Table 2: **Correlation Coefficients**

Variable	PCR	INFR	MPR	EXCH	INTR
Correlation between PCR and other variables					
PCR	1.0000				
INFR	-0.0168	1.0000			
	(0.4285)				
MPR	0.5104*	-0.1681	1.0000		
	(0.0736)	(0.2342)			
EXCH	0.6919***	0.0937**	0.3194	1.0000	
	(0.0000)	(0.0118)	(0.1831)		
INTR	0.3254**	-0.2869***	0.3873	0.1869	1.0000

	(0.0381)	(0.0000)	(0.6231)	(0.6288)	

Correlation between NPCR and other variables

Variable	NPCR	INFR	MPR	EXCH	INTR
NPCR	1.0000				
INFR	0.2118	1.0000			
	(0.0683)				
MPR	-0.2519	-0.1681	1.0000		
	(0.2876)	(0.2342)			
EXCH	-0.4395	0.0937**	0.3194	1.0000	
	(0.0000)	(0.0118)	(0.1831)		
INTR	0.3089	-0.2869***	0.3873	0.1869	1.0000
	(0.0174)	(0.0000)	(0.6231)	(0.6288)	

Note: Table 2 shows the correlations, which depict the direction and extent of linear relationship between two variables.

*, **, ***, signify significance at 10%, 5%, and 1% respectively. The coefficients are the pairwise correlation matrix.

P-value are in parenthesis. Performing credits (PCR), Non-performing credits (NPCR), Inflation rate (INFR), Monetary policy rate (MPR), Exchange rate (EXCR), and Interest rate (INTR).

Source: Author

5. Conclusions

The paper attempts to determine the association between bank credits and macroeconomic factors. The study seeks twofold aims: First the paper shows the relation between performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. Second, the paper shows the relation between non-performing credits and macroeconomic variables, such as Inflation rate, monetary policy rate, inflation rate, interest rate and exchange rate. For achieve the aim, the study applied a simple correlation framework to assess the direction and extent and test the significance of the relationship between the considered macroeconomic variables and both performing credits and non-performing credits. The findings detail the determinants of nonperforming and performing credits of commercial banks in Nigeria shall be beneficial to different stakeholders in the banking sector (Deposit Money Banks and micro finance banks), monetary authority (Central Bank of Nigeria) and researchers. The findings shall also be used as definite inputs in developing regulatory standards regarding the lending policies of Deposit Money Banks in Nigeria. This study shall sensitize the deposit money bank management to give due emphasis

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