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DETERMINANTS OF NON-PERFORMING LOANS IN NIGERIA

Olayinka Akinlo, Obafemi Awolowo University, Ile-Ife, Nigeria Mofoluwaso Emmanuel, Obafemi Awolowo University, Ile-Ife, Nigeria

ABSTRACT

Credit risk assessment is a major component of macro prudential analysis, with the aggregate non-performing loan ratio serving as a proxy for the economy-wide probability of default of the banking sector's overall loan exposure. Consequently, the factors that drive non-performing loans become pertinent. This study provides a macroeconomic model for non-performing loans for Nigeria. Our empirical analysis confirms that in the long run, economic growth is negatively related to non-performing loan. On the other hand, unemployment, credit to the private sector and exchange rate 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.

JEL: G01; G21

KEYWORDS: Determinants, Non-Performing Loans, Error Correction Model, Nigeria

INTRODUCTION

on-performing loans (NPLs) generally 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 and Klin-gebiel, 1999). It has become a critical issue of discourse in finance literature because of the close link between banking crises and massive accumulation of NPLs. Indeed, some studies have found that non-performing loans are one of the main reasons that cause insolvency of the financial institutions and ultimately hurt the whole economy (Hou 2007, Kane and Rice 2001). The costs of huge NPLs have been documented in the literature. Huge NPLs may negatively affect the level of private investment, increase deposit liabilities and constrain the scope of bank credit to the private sector. In the same way, accumulation of NPLs can negatively affect private consumption which may lead to economic contraction. Also, huge NPLs may exacerbate the already high pressure on government revenues as attempt to resolve it may force government to provide financial assistance to problem banks [Conzalez-Hermosillo et al, 1997].

Essentially, if the issue of non-performing loans is left unresolved, it can compound into financial crisis, where the loans exceed bank capital in a relatively large number of banks. Given the economic, fiscal and financial costs of non-performing loans, it is therefore imperative to control it. However, in order to control non-performing loans, it is necessary to understand its roots causes. It is in the light of this that the paper examines the determinants of non-performing loans in Nigeria. As far as the banking system of Nigeria is concerned, it has faced a lot of problems. One of the most destructive problems faced by the Nigerian financial sector is the huge amount of NPLs which not only harm efficiency and growth of the banking sector but also endanger growth and development of the Nigerian economy. The magnitude of non-performing loans in Nigeria increased from \$\frac{1}{2}73\$ million in 1981 to \$\frac{1}{2}4771\$ million in 1987. The total non-performing loans increased to \$\frac{1}{2}11,587\$ million in 2000 and further to \$\frac{1}{2}1,112,423\$ million in 2011. The phenomenal increase in non-performing loans in Nigeria over the years therefore makes it imperative to ascertain the causes of these loans in order to reduce it. The remainder of the paper is organized as follows:

the next section provides the review of empirical literature. Section 3 discusses the methodology, section 4 presents the estimation results of the econometric model. The last section provides the conclusion.

LITERATURE REVIEW

In this section, we provide a summary of the results of existing studies on the determinants of nonperforming loans. Keeton and Morris (1987) examined the factors that cause non-performing loans in the banking sector in America over the period 1979-1985. The results showed that bad performance of the agriculture and energy sectors coupled with poor economic settings/conditions were the main factors responsible for non-performing loans during the study period. The study by Sinkey and Greenwalt (1990) for the same country over the period 1984-1987, found high interest rate, unnecessary loans along with unpredictable funds as the main factors that increase non-performing loans in the banking sector of America. In the same vein, the study by Gambena (2000) for America over the period 1987-1999 showed that income and unemployment rates were the main factors that caused loan losses in America. Salas and Sanrina (2006) examined the determinants of NPLs for Spain over the period 1984-2003. The results of the estimation showed that high interest, GDP growth and soft credit conditions were the main factors determining NPLs in Spain. The study by Hoggarth, Forensen and Zuchina (2008) for United Kingdom over the period 1988-2004 found inflation and interest rates as the main determinants of non-performing loans in UK. The study by Rajan and Dhal (2003) for Indian banks showed GDP growth, bank size, credit orientation and credit terms were the main determinants of NPLs in India. The study by Erjavec, Cota and Jaksic (2012) for Croatia over the period 2000-2010 using a vector-autoregressive (VAR), showed a strong sensitivity of the Croatian banking sector to contractionary monetary policy shocks and to negative demand shocks. The study by Fainstein and Novikov (2011) for the Baltic countries examined the determinants of NPLs over the period 1997-2009. The results based on vector error correction model (VECM) found real GDP growth as the main determinant of NPLs in all the countries studied. The results showed that real estate market growth played an important role only in Latvia and Lithuania.

Vogiazes and Nikolaidu (2011) examined the determinants of NPLs in the Romanian banking sector over the period 2001-2010. The results showed that construction and investment expenditure, unemployment, inflation rate and Romania's external debt to GDP as well as money supply broadly defined were the main determinants of NPLs in Romania. The results of Vogiazes and Nikolaidou (2011) discussed above is very much in line with Bofondi and Ropele (2011) for Italy. Bofondi and Ropele found that non-performing loans were positively associated with the unemployment rates, and lending rates but negatively related with the growth of GDP for Italy over the period 1990-2010.

The study by Nkusu (2011) for twenty-six (26) advanced economies over the period 1998-2009 investigated the determinants of NPL ratio and of the first difference of the NPL ratio. The results showed that adverse macroeconomic development in particular a contraction of real GDP, a high unemployment rate, high interest rates, a fall in house prices and a fall in equity prices negatively affected NPLs. In the same way, study by De Bock and Demyanets (2012) for 25 developing economies over the period 1996-2010 revealed that real GDP contraction, currency depreciation against the US dollar, weaker terms of trade and outflows of debt – creating capital precipitated higher aggregate NPL ratio of the banking sector.

The study by Beck, Jakubik and Piloui (2013) for 75 advanced and emerging economies for the period 2000 to 2010 investigated the determinants of NPLs in these countries. The results of the estimation showed that real GDP growth, share prices, nominal effective exchange rate of the local currency and bank lending rate had significant effect on NPL ratio. The study revealed that direction of the impact of exchange rates is a function of the extent of foreign exchange lending to unhedged borrowers. Additionally, the results showed that the impact of the share prices was larger in countries that had a large stock market relative to GDP. The study by Louzis, Vouldis and Metaxas (2011) for Greek banking sector over the 2003 and 2009 found real GDP growth, unemployment lending rates, public debt and management quality as the main determinants

of non-performing loans in Greece. Finally, the Khemraj and Pasha (2009) explored the determinants of NPL in Guyana over the period 1994-2004. The results showed that growth of GDP had an inverse relationship with NPLs while real effective exchange rate and higher lending rate had direct relationship with NPLs.

DATA AND METHODOLOGY

The data utilized are annual data for Nigeria over the period 1981-2011. These are as defined under model specification (eqn 1). The data were sourced from Central Bank of Nigeria, Statistical Bulletin (2011). All variables are expressed in logarithm. To examine the determinants of NPLs in Nigeria, the specified and estimated equation 1 below based on earlier work.

$$\begin{aligned} NPLs_t &= \alpha_0 + \alpha_1 GDP_t + \alpha_2 CPS_t + \alpha_3 UNE_t + \alpha_4 MON_t + \alpha_5 LDR_t + \alpha_6 INF_t + \alpha_7 EXR_t + \\ \alpha_8 MKT_t + \alpha_9 D_{2009-2010} + \varepsilon_t \end{aligned} \tag{1}$$

where NPLs_t refers to non-performing loans. GDP_t is the gross domestic product, CPS_t is total credit to the private sector as a ratio of GDP, UNE_t is the unemployment rate, MON_t is money supply broadly defined, LDR_t is the lending rate, MKT_t is the stock market price index, INF_t is the rate of inflation, EXR_t is the real exchange rate, $D_{2007-2010}$ is dummy variable to account for the recapitalization and other policies introduced in the banking sector from 1997, ϵ_t is the error term. We anticipate that α_t will be negative. This is based on the argument that growth in gross domestic product usually leads to increase in income which ultimately enhances the loan payment capacity of the borrower which in turn contributes to lower bad loan and vice versa (Khemraj and Pasha, 2009). α_t is expected to be negative. Generally, the increase in loans by commercial banks will have positive impact on NPLs but the increase in credit to the private sector will have a positive impact on reducing the NPL. α_t 3 is expected to be positive. This is based on the argument that an increase in the unemployment in the country negatively affects the incomes of the individuals which increases their debt burden. The coefficient of money supply α_t 4 is expected to be positive. It is assumed that an increase in the aggregate stock of money will contribute to a deterioration of banks portfolios in the country with adverse impact on NPLs. The coefficient of lending rate α_t 5 is expected to be positive.

An increase in lending rate tends to weaken loan payment capacity of the borrower and thus increase NPLs. The coefficient of inflation $\alpha 6$ is indeterminate. It can be positive or negative. This is because inflation can affect loan payment capacity of borrowers positively or negatively. Higher inflation can enhance the loan payment capacity of borrowers by reducing the real value of outstanding debt. Under this circumstance, inflation will reduce NPLs. However, inflation can weaken the loan payment capacity of borrowers by reducing the real income when salary and wages are sticky. Under this scenario, NPLs will increase. The coefficient of exchange rate $\alpha 7$ is indeterminate. $\alpha 7$ will be positive if appreciation of exchange rate leads to a fall in exports coupled with terms of trade deterioration. On the other hand, $\alpha 7$ will be negative if the loan repayment capacity of the borrowers who borrow in foreign currency is enhanced. Finally, $\alpha 8$ is expected to be negative. The stock market index as a leading variable for financial and economic development that directly influence NPL ratio is expected to be negative as enhanced stock market activity should boost income. In estimation, the study adopts the cointegration and error correction modeling approach.

RESULTS AND DISCUSSION

Table 1 presents descriptive statistics for variables used in the estimation. Table 1 shows that all the series display a high level of consistency as their mean and median values are perpetually within the maximum and minimum values of the series. The statistics in Table 1 reveal that the series except unemployment rate, exchange rate, money supply and openness are leptokurtic (peaked) relative to normal as the kurtosis value exceeds 3.0. Finally, the probability that the Jarque-Bera statistic exceeds (in absolute value) the observed

value is generally low for almost all the series suggesting the rejection of the hypothesis of normal distribution at 5 per cent level of significance.

Table 1: Descriptive Statistics

	NPL	GDP	UNE	CPS	EXC	MON	MKT	LDR	INF	LDR	OPE
Mean	261,734	70,102	8.5129	17.335	67.414	24.826	2078.5	20.685	21.737	20.685	5.3058
Median	57,439	270,271	6.2000	15.900	81.252	24.200	262.60	20.860	12.700	20.860	5.3800
Max	292,280	32,264	22.300	36.700	153.86	38.000	13,294	36.090	72.800	36.090	8.7500
Min	206.00	47,619	1.8000	8.800	0.6100	12.800	5.0000	10.000	4.7000	10.000	2.6400
Std Dev	56,760	981650	5.9089	6.6238	58.870	6.8075	3,733.6	6.0214	19.172	6.0214	1.8571
Skew	36,591	1.3485	0.7916	1.1308	0.0684	0.1835	1.7826	0.2813	1.2742	0.2813	0.2714
Kurt	16.983	3.4361	2.5202	3.8487	1.3251	1.9075	4.7995	3.2356	3.3067	3.2356	1.8554
Jarque-Bera	321.75***	9.6404***	3.5349	7.5371**	3.6476	1.7155	20.602***	0.4806	8.5102***	0.4806	2.0728
Prob Sum	0.0000	0.0081	0.1708	0.0231	0.1614	0.4241	0.0000	0.7864	0.0142	0.7863	0.3547
Sum	81,137	0.0000	263.90	537.40	2,089.8	769.60	64,432	641.24	673.86	641.24	164.48
Sum Sq. Dev.	0.0000	0.000	1,047.4	1316.2	103,969	1390.2	0.0000	1,087.7	11,027	1,087.7	103.47
Obs.	31	31	31	31	31	31	31	31	31	31	31

This table shows the descriptive statistics of the variables used in the analysis. ** and *** denote significance at 5% and 1% levels respectively.

Unit Root Test

To distinguish between correlation that arises from a share trend and one associated with an underlying causal, we tested for unit root. The two tests used were Augmented Dickey-fuller test (ADF) (Dickey and Fuller, 1981) with a constant and a deterministic trend and Phillips-Peron (PP) (Phillip and Perron, 1988). The results of the two tests are presented below in Table 2.

Table 2: Unit Root Test

Series		ADF	PP		
	Level	1st difference	Level	1st difference	
NPL (constant)	-2.663	-3.669	-3.278	-7.152	
(constant and trend)	-3.544	-4.461	-1.910	-16.071	
LDR (constant)	-2.731	-5.439	-2.679	-7.193	
(constant and trend)	-2.582	-5.708	-2.486	-7.133	
GDP(constant)	-0.528	-4.470	-0.521	-4.460	
(constant and trend)	-1.286	-4.450	-1.615	-4.450	
INF (constant)	-3.257	-6.350	-3.089	-7.974	
(constant and trend)	-4.179	-6.210	-2.994	-8.200	
EXC (constant)	-2.087	-4.870	-2.114	-4.912	
(constant and trend)	-0.503	-5.657	-0.453	-5.881	
MON (constant)	-1.610	-4.684	-1.742	-4.644	
(constant and trend)	-1.376	-4.600	-1.407	-5.702	
CPS (constant)	-1.483	-4.929	-1.610	-4.988	
(constant and trend)	-1.464	-4.753	-1.346	-9.968	
UNE (constant)	-0.650	-5.313	-0.650	-5.313	
(constant and trend)	-1.626	5.180	-1.624	-5.504	
MKT(constant)	-0.163	-4.178	-0.163	-4.118	
(constant and trend)	-2.827	-4.062	-2.682	-3.992	

Notes: Critical values for ADF are: -3.67, -2.96, and -2.62 (constant only); -4.32, -3.58, and -3.22 (constant and trend) at 1%, 5% and 10% level of significance respectively. However, the critical values for PP test are: -3.67, -2.96 and -2.62 (constant only), -4.30, -3.57 and -3.22 (constant and trend) at 1%, 5% and 10% level of significance, respectively

The results show that all the variables are integrated of order one or I(1). Only inflation is stationary at level. Having established that the variables are I(1), Johansen-Juselius (1990) technique was applied to determine whether there is a least one linear contribution of these variables that is I(0). Given that a cointegrating relationship is present among the selected variables in level, an error correction (EC) model can be estimated, that is, a model that combines both the short run properties of the economic relationships

in the first difference form of equation 1; as well as the long run information provided by the data in level form.

Table 3: Johansen Juselius Co-Integration

Null		Max-Eigen	Critical	Trace	Critical Values			
	R		Values					
0	1	25.661	33.877	73.215	69.819**			
≤1	2	17.784	27.584	47.554	47.856			
≤2 ≤3	3	16.959	21.132	29.770	29.797			
≤3	4	11.919	14.265	12.811	15.795			
≤4	5	0.891	3.841	0.891	3.841			
Panel (B): Estimates of Co-Integrating Vector								
Npl	GDP	UNE	(CPS	EXC			
-1.000	-1.027(-3.273)*	** 0.351(1.2	81) 3.519(6	6.640)***	2.402(7.128)***			

Note: Table 3 shows the results for Johansen-Juselius cointegration test. t ratios are in parentheses.** and *** denote significance at 5% and 1% levels respectively.

The results of the max-Eigen and the trace tests are as shown in panel A of Table 3. The co-integrating equation (normalized on NPL variable) is as shown in panel B of Table 2. The results in panel A of Table 3 shows that the null hypothesis of no co-integration i.e. 0 can be rejected for only trace test. The cointegrating equation (normalized on NPLs) given in panel B of Table 2 indicates that gross domestic product has negative sign while unemployment, credit to private sector and exchange rate are positive. All the coefficients except unemployment are significant as shown by their t-ratios indicated in parenthesis. The coefficient of unemployment is only significant at 20 per cent level. The results in panel B of Table 3 shows that growth of GDP is negatively related to non-performing loans and the coefficient is significant. This shows that in the long run, a per cent increase in GDP will reduce non-performing loan by 1.027 per cent. This result is consistent with the findings of Louzis, Vouldis and Metaxas (2011) for Greece, Khemraj and Pasha (2009) for Guyana, Salas and Saurina (2002) for Spain.

The coefficient of unemployment is positive though significant only at 20%. This indeed conforms to a priori expectation. This could mean that increase in unemployment negatively affect income of individuals thereby increasing their debt burden. It could also mean that increased unemployment in the economy negatively affected the demand for products of firms which ultimately affected the production/sales of the firms, which led to a decline in revenues of the firms and a fragile debt conditions. The results show that credit to the private sector and exchange rates are directly related to NPLs. Exchange rate appreciation might have contributed to a deterioration of bank portfolios. The same applies to credit to the private sector.

Following this, we utilize the information provided by Likelihood Ratio (L.R.) tests to generate a set of Error correction models that incorporate both the short and long-run elasticities, while the coefficients of the error correction (ECM) term represents the speed of adjustment back to the long run relationship among variables. The result of the estimation is presented in Table 4. The results show that growth of GDP is negative but the coefficient is not significant. All the same, the coefficient is consistent with a priori expectation. Unemployment rate increases NPLs but the coefficient is not significant. The results in Table 4 show that higher credit to the private sector is associated with increased NPLs, consistent with the findings of Jakubic and Reininger (2013), Nkusu (2011), Vogiazas and Nikolaidou (2011) for Romania; Bafondi and Ropele (2011) for Italy.

Table 4: Nigeria Error Correction Model (Dependent Variable Δln(Npl_t)

OLS	·	<u> </u>	_	_	<u> </u>	
Variables	1	2	3	4	5	6
Constant	1.896**(2.34)	0.443(0.57)	0.532(0.74)	1.736(1.95)*	1.893(2.28)	2.171**(2.50)
$\Delta lnGDP_t$	-0.06(-0.69)	` ` ′	` ` ′	0.117(-0.15)	-0.047(-0.06)	0.135(0.19)
$\Delta lnUNE_t$	0.185(0.77)			0.212(0.82)	0.186(0.76)	0.172(0.71)
$\Delta lnCPS_t$	1.346***(2.67)			1.156*(1.68)	1.326**(2.16)	1.553*(2.81)
$\Delta lnEXC_t$	0.952***(2.96)		0.864***(2.76)	0.908**(2.40)	0.961**(2.68)	1.002***(3.07)
$\Delta lnLDR_t$, , , ,	0.852*(1.67)*	· · · · · ·	0.322(0.73)	` '	`
$\Delta lnMON_t$		0.029(0.05)	0.747(1.13)	0.214(0.22)	0.055(0.06)	
$\Delta lnMKT_t$		-0.374(-1.04)	-0.478*(-1.59)	` /	` /	
$\Delta lnOPE_t$		0.966(1.003)	` /			
$\Delta lnINF_t$, ,				-0.100(-0.91)
D_{it}				-0.031(-0.14)		` /
ECM t-1	-0.26**(-2.12)	-0.016(-0.13)	-0.04(-0.36)	-0.237**(-1.80)	-0.263**(-2.14)	-0.311**(-2.36)
\mathbb{R}^2	0.41	0.29	0.40	0.42	0.41	0.43
S.E.	0.41	0.46	0.41	0.43	0.42	0.41
D.W.	2.40	1.88	2.09	2.3	2.4	2.3
AR(1)	_	-0.396	0.388	_	-	_

Table 4 shows the results of the error correction models. *, ** and *** denote significance at 10%, 5% and 1% levels respectively, t-ratios in parenthesis.

The significant positive association between domestic credit and NPLs possibly suggests that the numerous problems banks continued to operate and contribute to the growth of domestic credit and to the extent that most bank experienced high level of inefficiency over the years. The negative association may reflect the delay in the implementation of financial and operational restructuring measures and some survival strategies adopted by the banks that prolonged their life thereby saving them from being declared bankrupt. The result is consistent with the funding of Fofack (2005) for SSA countries. However, the result contradicts the result of Alizade hJanvisloo and Muhammad (2013) for Malaysia.

The analyses suggest that exchange rate is associated with increase in NPLs. This indeed suggests that an appreciation of the exchange rate weakened the performance of the export-oriented sectors of the economy, thereby exacerbating the banking crisis. The result is consistent with the findings of Khemraj and Pasha (2009) for Guyana, Fofack (2005) for some selected sub-sahara African countries and Jakubik and Reininger (2013) for 7 European Countries. The result shows that the coefficient of money supply is positive meaning that increase in money supply leads to increase in non-performing loans. This clearly supports the positive association found between credit to the private sector and NPLs. This shows that an increase in aggregate stock of money may have contributed to a deterioration of banks portfolio in the country. This simply suggests that the banking crisis coupled with exchange rate crisis might have produced the classical Twin crises (Goldfajn and Valdes 1995, Kaminsky and Reinhart 1999). It needs be pointed out that the coefficient of money supply is not significant.

The analysis shows that inflation rate is negatively related to NPLs. This possibly suggests that inflation leads to increase in the value of customers' assets with positive effect on NPLs. Asides; it could be a reflection of the positive effect of moderate inflation on economic growth with positive effect on NPLs. However, conclusive inference cannot be based on this as the coefficient of inflation is not significant. Banking lending rate has positive relationship with NPLs and is significant at 10%. The persistence of high and prohibitive lending rates possibly transform a fragile banking system into a financial crisis through accumulation of defaults on loan payments and the moral hazard channel. This is not unexpected because the deregulation of the banking system in Nigeria in the early 80s precipitated in a rapid increase in lending rate over the years. Finally, the coefficient of stock market index is negative. The coefficient is significant at 10%. This tends to stress the role of stock market as leading variable for financial and economic developments that directly influence NPLs. This simply means that boost in stock market will have positive effect on NPLs in Nigeria.

CONCLUSION

High and increasing non-performing loans portend great danger in any economy as exemplified in the financial crisis that spread throughout the whole world from 2007. The goal of this paper is to identify those factors that are responsible for non-performing loans. Knowledge of such factors will help in the formulation of policies to address the problem of NPLs. The data utilized are annual data for Nigeria over the period 1981-2011. Data on non-performing loans, gross domestic product, total credit to the private sector, unemployment rate, money supply, lending rate, stock market price index, rate of inflation, and real exchange rate were sourced from Central Bank of Nigeria, Statistical Bulletin (2011). All variables are expressed in logarithm. The results of the analysis shows that increase in real GDP tends to reduce non-performing loans both in the short and long run. However, the impact is only significant in the long run. This clearly suggests policies designed to boost GDP and income will help to reduce NPLs.

Exchange rate and credit to the private sector tend to increase non-performing loan. Moreover, lending rate has increasing effect on NPLs. This means that government needs to design policies that will help reduce the cost of borrowing in the domestic economy. Finally, the stock market index has a negative effect on NPLs meaning that increasing stock market activity will help reduce NPLs. In summary, government efforts of increasing economic growth, mop up excess liquidity in the economy, reduce the unemployment rate and boost stock market development will lead to reduction in aggregate non-performing loans in Nigeria. Our study is not without limitations. One, this study has not considered the probable structural breaks during the period under consideration. Secondly, it is a single country study. Subsequent studies should apply unit root test allowing for structural breaks. Also, a multicountry study that will cover the whole of Sub-Saharan Africa should be an area of future research.

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BIOGRAPHY

Akinlo, Olayinka O. is a senior Lecturer in the Department of Management and Accounting, Obafemi Awolowo University, Ile-Ife, Nigeria. She can be contacted at the Department and through email yinkakinlo@gmail.com, yakinlo@oauife.edu.ng or through telephone on +2348037193075.

Emmanuel, Mofoluwaso is a Lecturer in the Department of Management and Accounting, Obafemi Awolowo University, Ile-Ife, Nigeria. She can be contacted at the Department and through email folusoobi@yahoo.com or through telephone on +2348064405059.