

Loan Growth, Bank Solvency and Firm Value: A Comparative Study of Nigerian and Malaysian Commercial Banks

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Abstract: The study explore the issues relating to credit growth, non-performing credit and bank solvency in the banking industry, recognizing that existing studies are largely sketchy in emerging and developing markets. Panel data estimation technique is employed in the study based on data extracted from 26 commercial banks in Nigeria and Malaysia over the period 2009 to 2017 making up to 234 observations. The results reveal that the NPLs for all banks is only explained by loan growth and inflation, NPLs for Nigerian banks is only explained by loan growth, leverage, efficiency, size and inflations while NPLs for Malaysian banks is only explained by leverage, efficiency, size, GDP and inflation. The bank solvency for all banks is only explained by NPLs, loan growth and leverage. The solvency for Nigerian banks is explained by NPLs, leverage and GDP while loan growth, size and inflation explained bank solvency for Malaysian banks. Firm value for all banks is explained by solvency, NPLs, leverage, efficiency, size and GDP, the value of firm for Nigerian banks is only explained by solvency, loan growth, leverage, efficiency and size. The firm value for Malaysian banks is only explained by solvency, loan growth, leverage, efficiency, size, GDP and inflation. It is observed that bank solvency play an important role in the firm value of commercial banks in the period of study. Hence, this paper contributes to the understanding of the dynamic role of abnormal loan growth and how it can enhance the volume of non-performing credit and suggest that further study can explore the interaction between abnormal loan growth and non-performing loans.

Keywords: Loan growth, non-performing loans, firm value, bank solvency, panel data analysis.

BACKGROUND

Banks are germane to economic development through the financial services they offer and often allocate their savings to individuals, business developers, entrepreneurs, competitive firms and government to accelerate capital accumulation and profitability. Been a catalyst for economic growth, banks through financial intermediaries channels their accumulated financial resources from depositors to borrowers (Levine, 2002). Globally, participants in the markets recognised the importance of financial sector whose activities spurs growth, increases long-term sustainability of livelihood and strengthens infrastructural development. Apparently, empirical research has validated that the driving forces for economic growth lie in the efficient and effective performance of the banking industry. The history of recent financial crises clearly illustrates what can go wrong when there is excessive credit growth. Many financial crises that spread to some of the ASEAN countries and particularly, in Nigeria have been preceded by episodes of abnormal credit growth that led to an upsurge in institutions failures and the development of asset price bubbles. This necessitates the studies of this kind for banks in an emerging and developing economy.

Current debates among researchers reinforced that the existence of a complex nexus relating to the benefits of financial liberalization is often a critical issue (Kashif, Iftikhar & Iftikhar, 2016). Further study argued vigorously that lending growth is triggered by financial liberalization and as a result of the cost of crisis, economy-wide output increases at the equilibrium (Allen & Gale, 2003). The aftermath of the financial crisis increased and raises some considerable concern regarding the abnormally rapid loan growth experienced by banks that was linked to financial institution's excessively easy credit standards. Some recent studies posited that abnormal loan growth could lead to reduction in shareholder's profit, increase in loan loss and non-performing loan (Foos Norden & Weber, 2010; Torres & Pabon, 2013). The study by Foos *et al.* (2010) found that abnormal loan growth increases loan loss and decreases profitability and solvency. Further views from the study claimed that abnormal rapid loan growth should be considered as a risk in itself.

Like any other businesses, conventional banks have expanded the magnitude of their credit and advance to generate more earnings and have changed continuously with the surrounding environment. On a different note, the accessibility of companies and entrepreneurs to debt capital triggers the development of new businesses. The availability of loanable funds to local firms helps to increase profit and strengthens the local economies which spur local employment.

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Nonetheless, the chances of loan losses will be higher provided the tremendous rise in loan expansion is aggressive (Kashif, Iftikhar & Iftikhar, 2016). The study by Tieman and Hardy (2008) explicates that improved economic conditions can lead to fast loan growth. The study further explained that many countries have had steady and fast economic growth and lower inflation. As a result, financial firms are expected to broaden their business income, households are expected to spend more and profitability are expected to be high and these expectations often lead to higher loan demands. Related empirical researches have emphasized that the inherent risk related to extreme bank lending often leads to an upsurge in loan losses which affects the dynamic financial sector and the entire economy.

In relation to this, this study investigates whether an upsurge in lending growth always results in higher loan losses and the effect of loan growth and non-performing credit on firm value and bank solvency. Several findings explicate the consequences that come with abnormal loan growth; vibrant banking system in emerging and developing economies are facilitators for both borrower and lender, providing an avenue for firms to improve its operations and enhancing the potential markets for their products. Specifically, this study explores the nexus between lending growth, risk taking behaviour of banks, banks financial health and as well discusses the effect of loan growth, non-performing loan and solvency on the value of firm. In order to evaluate the association between lending growth and risk-taking behaviour of banks, panel data is employed in this study on 26 commercial banks from Nigeria and Malaysia over 2009 – 2017. The implication of this study to the corporate finance literature is in three ways. First, within the limit of the researchers' knowledge, there is absent of studies that examine lending growth and banks' risk-taking behaviour nexus using cross-sectional time series data for an emerging and developing economy. Second, it also explores the role of loan growth and non-performing credits on the solvency of bank. Finally, it investigates the effects of lending growth, bank solvency, and non-performing credits, bank-specific and macroeconomic variables on the value of firm.

Therefore, the findings of this study provide significant perceptions and understanding to the supervisory body into the riskiness, stability and its effect on the long-term performance. Also, it assists in undertaking an additional regulatory measures that's capable of ensuring the financial stability of the banks

when abnormal loan growth is observed. Another perspective is that while balance sheet expands, banks can internalize the likelihood cost of their riskier behaviour through the imposition of individual additional capital requirements. Thus, the other section of the paper is organized as follows. Related literatures section provides a review of literature. The sources of data were discussed and the definition of variables, research methodology explicitly presents the research hypotheses and empirical model while the empirical results and discussion section explicates the empirical findings and conclusion ends this study.

REVIEW OF RELATED LITERATURE

The lending of banks serves as a vital source of funding for borrower such as households and firms. Conversely, a country with an underdeveloped capital market is independent of external funding as compared to a developed capital market. Clearly, bank credit is the external funding in a financial based economy. The continuous flow of credit and availability of loans play an important role, providing capital for investment and refinancing. However, the excessive expansion in bank credit can adversely influence the riskiness of banks and documented studies argue that credit growth has a significant effect on financial health. The study of Torres and Pabon (2013) focused on abnormal loan growth and risk taking behaviour of financial institutions in Columbia. The empirical results revealed that perpetual growth in abnormal credit leads to an incredibly increase in the non-performing loan ratio while solvency is found to be negatively significant in the long run. The study by Tafri, Rahman and Omar (2009) on financial risks in Malaysia explicates in their findings that an increase in loan loss result in lower margin. Limited access of banks to funding might extremely increase loan loss with severe exposure to insolvency risk that's capable of causing a systemic crisis.

Therefore, subject to individual characteristics, there is a hierarchy for each individual's access to external sources of funding. For example, the study of Gourio and Miao (2010) explicates that firms access to the capital market is often significantly affected by their differences in cash flow and size. In actual fact, the study of Kashyap *et al.* 1993 posits that firms with absolute reliance on banking credit for external funding have limited access to the capital market as a result of low level of cash flow. Thus, this limited access is a stronger constraint as information imperfections persist in emerging market economies with less developed

capital markets. Some related studies have examined the banks' solvency determinants and a few others exploring banks' risks and profitability. The study of Foos *et al.* (2010) explicitly examined 16,000 individual banks across 16 countries, investigating the impact of abnormal loan growth on the solvency of banks' and controlling for bank size with several other bank-specific effects. The capitalisation ratio (equity to assets ratio) was used in the study as a proxy for solvency, and obtains a significantly negative association with abnormal loan growth and a positive relationship with bank size.

Similarly, Messai and Jouini (2013) studied the non-performing loans determinants in Greece, Spain and Italy for period 2004-2008 and found that NPLs rise when bank increased provision and that the return on assets of banks has a negative effect on NPLs. Furthermore, Shehzad *et al.* (2010) examined a sample of 800 banks from 50 countries and analysed the determinants of banks' capital adequacy ratio and the empirical result indicate that increased loan growth in banks and a reduced cost-to-income ratios leads to higher capital adequacy ratios. Additionally, the study by Francis and Osborne (2010) observed that the risk (proxied by regulatory risk weights), return on equity, size of bank and GDP have a negative effect on capital adequacy ratios. Few empirical research reports the impact of bank specific and macroeconomic factors on bank risk and performance. Of this is the study of Laeven and Majnoni (2003), which investigates the influence of lending growth on loan loss provisions based on 1,419 banks among 45 countries for the period 1988-1999. The study found a negative and significant nexus between lending growth and loan loss provisions, implying that the rapid credit expansion of banks makes them behave less prudently.

The study by Baradwaj *et al.* (2014) examined the impact of lending growth on the riskiness of Chinese banks from the period 1992 - 2007. The empirical results revealed that lending growth increases loan loss provisions, interest income but decrease the capital ratios. The finding further indicated that loan growth is an important driver of the riskiness of banks. Likewise, the study by Cucinelli (2015) further explicates that lending by the banks reduced as a result of fear of credit risk during the financial crisis while there is a positive impact of GDP growth rate on the lending behaviour of banks. Kashif, Iftikhar and Iftikhar (2016) in their study of loan growth and bank solvency for the period 2006 - 2014. The findings explicates that loan growth has a significant effect on bank-specific and

macroeconomic specific variables. It suggest further that the loan growth in the previous year raises the non-performing loans and decreases the solvency of banks with a time lag of many years. The driving force behind this phenomenon is weak prudential regulation among competitors, the asymmetric information of the borrowers, and that banks underestimate the risk of lending during the credit booms.

Another review of banking and finance literature focused on the magnitude to which lending growth, bank-specific and macroeconomic are related to the profitability banks'. Studies show that abnormal and excessive loan growth severely affects bank interest income, leading to decreases in profitability. On the other hand, the capital ratio of banks reduced as a result of extensive loan growth which negatively affect solvency. Numerous studies in this perspective empirically confirms that bank-specific variables such as firm size (Goddard, Molyneux, & Wilson, 2004; Pasiouras & Kosmidou, 2007; Foos *et al.*, 2010; García-Herrero & Vázquez, 2013), Abnormal Loan Growth (Foos *et al.*, 2010), cost to income ratio (Pasiouras & Kosmidou, 2007), share of deposits (García-Herrero, Gavilá, & Santabárbara, 2009) and capitalisation (García-Herrero *et al.*, 2009; Pasiouras & Kosmidou, 2007; Demirgüç-Kunt & Huizinga, 1999) affect the profitability of banks. Hence, this study analysed whether the loan decisions made by management of commercial banks lead to similar consequences (i.e. an increase of non-performing credit and a decrease of profitability and solvency).

DATA SOURCES AND DEFINITION OF VARIABLES

This study analyses panel data on 26 commercial banks in Nigeria and Malaysia, a comparative study between emerging and developing economies for the period 2009 - 2017. The dataset on the bank-specific risks variables and determinants includes non-performing loans, loan loss ratio, loan growth, solvency, bank size, efficiency and leverage ratio are extracted from the balance sheets of individual banks and Thomson Reuters. The macro-economic variables such as GDP growth rate and inflation are extracted from the World Bank Development Indicator. The macroeconomic variables were included in the model as prior studies affirms its direct or indirect non-linear relationships with the bank-specific variables. Tinoco-Zermeno *et al.* (2014) posits that the potentials of banks to generate higher profit is often affected by the dynamics of inflation rates, leading to a reduction in private credit and discourages financial development,

while the availability of credit positively influences the GDP growth.

FIRM VALUE VARIABLE

This study employs the enterprise value, which is generally used in identifying undervalued firms and is a robust market value proxy (Lifland 2011), because it captures the actual and overall market value of firm as a whole business and it's an economic measure useful for the valuation of firms (Bhullar & Bhatnagar 2013). Enterprise value put into consideration debt obligations, non-controlling minority interest and excess cash in valuing a firm. Thus, this study used a unique ratio of enterprise value-to-operating performance (EV/EBITDA) as a measure of firm value. Therefore, the enterprise value divided by Earnings before interest, taxes, depreciation and amortization (EV/EBITDA) represents the proxy for firm value. Enterprise value is measured as equity value + total debt- cash & cash equivalents + preferred stock + minority interest.

RISK AND BANK-SPECIFIC VARIABLES

The non-performing loan to gross loan explains the loan portfolio quality of a bank. Apparently, it denotes the larger proportion of default and/or defaulting loans made by a bank and this ratio appraises the asset quality based on the loan portfolio (Tafri, Rahman & Omar, 2009). This ratio represents the credit risk faced by banks and/or use as a measure for asset quality to ascertain the problems in the loan portfolio.

Furthermore, bank solvency is often proxy by the ratio of total capital (sum of tier1 and tier2) to risk-weighted assets, reflecting the capital strength of a bank (Alper & Anbar, 2011). Even though capital surplus has the capability to absorb shocks in the credit markets, an increase in capital of bank typically accelerates risky credit activities, leading to extreme loan losses. On the other hand, bank managers face severe pressure to accumulate more assets and returns due to the low level of capital that may increase loan losses.

Moreover, the change in the current year's loan as a percentage of loan of the previous years represents the loan growth. The ultimate objective of financial institutions is to raise profit and market share through credit creation. However, the effectiveness of loan is reduced because of lack of creditworthiness, implementation of delicate business models and the managers' leniency in selecting borrowers.

The total shareholders' equity as a percentage of total assets define leverage ratio. By implication, a well-capitalized banks have a high leverage ratio. Financial institutions with a lower level of leverage tend to use their earnings before sourcing for external funding and this permits banks to use its accumulated capitals through direct investment for potential gains. Beyond the fear of loan consequences, the intention to gain higher return on equity allows the banks more financial opportunity to procure more assets.

The efficiency ratio is proxy by the total operating expenses to total assets and also represents the total overheads of banks, implying that the weaker efficiency becomes with increase in the ratio. The total operating expenses include professional service fees, employee wages and salaries, employee benefits, taxes, equipment and property leases. Hence, if bad growth in loan increases the loan loss provision, then non-performing loans increase.

CONTROL VARIABLES

Usually, bank size is often measured by using natural log total assets and is used as a control variable in this study (Alper & Anbar, 2011). Banks with rapid expansion usually pursue diversification in lending, have an increased concentration of market activities, concentrate on consumer financing and are indifferent with respect to asymmetric information of borrowers. Thus, the expectation from this nexus between the size of banks and NPLs is negative. However, based on the premise that credit risk is size related larger banks are expected to have a lower credit related risk since they are likely to take on more risky projects unlike the smaller banks which lend aggressively when loan demand increases in anticipation of a higher return (Kashif, Iftikhar & Iftikhar, 2016). Hence, bank size is expected to be positively related to the value of firm.

Favourable economic growth in any country spurs households' income and other businesses and the direction of economic progress is as a result of growth in GDP. Hence, the availability of sufficient reserves to borrowers helps facilitates their debts as favourable market activity encourages lending. However, Foos et al. (2010) emphasized that the loan losses of banks will likely increase during economic slowdown due to the possibility that borrowers might default three or more years later. Therefore, the study assume a negative relationship between NPLs and economic growth. In

addition, since banks are most likely to deal with more of lending, borrowing and other non-interest bearing services during the economic growth.

This study expects a positive relationship between GDP growth and the value of firm (Athanasoglou *et al.* 2008; Sinha & Sharma, 2016). Furthermore, control variable use in this study is inflation. Marijana Ćurak *et al.* (2013) in their study explicates that low level of inflation rate and a stable price suggest a positive economic growth and possibly raises the capacity of debtors to repay loans. Hence, volatility in prices leads to a decline in the actual value of debt and debtors can easily repay their loans.

METHODOLOGY

The method and estimation employed in this study is the panel data analysis and it's a special techniques which accounts for the time-series and cross-sectional dimension of the dataset. By implication, it gives more informative data with less variability but less collinearity among the variables and substantially reduces the problems that arise from omitted variables. Hence, panel data models are mostly estimated using either fixed effects or random effects models.

$$NPL_{it} = \beta_0 + \beta_1 \text{BANK specific}_{it} + \beta_2 \text{CONTROL variables}_{it} + \varepsilon_{i,t} \quad (1)$$

$$NPL_{Nit} = \beta_0 + \beta_1 \text{BANK specific}_{Nit} + \beta_2 \text{CONTROL variables}_{Nit} + \varepsilon_{Nit} \quad (2)$$

$$NPL_{Mit} = \beta_0 + \beta_1 \text{BANK specific}_{Mit} + \beta_2 \text{CONTROL variables}_{Mit} + \varepsilon_{Mit} \quad (3)$$

Where *NPL* represents non-performing loan to gross loan, while the bank-specific contains the *loan growth*, *efficiency* and *leverage ratio* of bank *i* at time *t*. Control-variables includes *bank size*, *GDP* growth and *inflation*. *n* represents Nigeria, *m* represents Malaysia.

H₁: Loan Growth Significantly Influences the Volume of *NPLs*

The first hypothesis in this study explicates how loan growth affects the *NPLs* of commercial banks in emerging and developing economies. Typically, the probability of loan default in the future is linked with growth in lending, and may likely spur the loan loss provision and increase the loan loss reserves. Hence, this study postulates that prior loan growth translates into an increase in *NPLs*.

$$CAR_{it} = \beta_0 + \beta_1 \text{BANK specific}_{it} + \beta_2 \text{CONTROL variables}_{it} + \varepsilon_{i,t} \quad (4)$$

$$CAR_{Nit} = \beta_0 + \beta_1 \text{BANK specific}_{Nit} + \beta_2 \text{CONTROL variables}_{Nit} + \varepsilon_{Ni,t} \quad (5)$$

$$CAR_{Mit} = \beta_0 + \beta_1 \text{BANK specific}_{Mit} + \beta_2 \text{CONTROL variables}_{Mit} + \varepsilon_{Mit} \quad (6)$$

In Eq. (4, 5, 6), we empirically tested the *bank-specific* and *control/macroeconomic* variables on *bank solvency*. Where *CAR* represents the *capital adequacy ratio* used to measure solvency.

H₂: Loan Growth and Non-Performing Loans Significantly affect Bank Solvency

The second hypothesis in this study investigates the impact of loan growth and non-performing credit on bank solvency. The credit function of banks demands a high degree of management skills as an increase in credit risk (loan growth and *NPLs*) leads to an upsurge in marginal cost of debt, which translates to rising cost of funds for the banks. In order to curtail the possibility of insolvency, the accumulation of capital by banks is a signal for unanticipated events and higher rating among the competitors. The capital strength indicates the soundness of banks and affords the banking institution a large network. Thus, it is vital to continuously monitor the operational activities across the entire business as reluctant activities aggregate the probability of inherent risks in business. Hence, capital expansion may result in loan growth, leading to a decrease in the total capital to risk-weighted assets ratio.

$$FV_{it} = \beta_0 + \beta_1 \text{BANK specific}_{it} + \beta_2 \text{CONTROL variables}_{it} + \varepsilon_{i,t} \quad (4)$$

$$FV_{Nit} = \beta_0 + \beta_1 \text{BANK specific}_{Nit} + \beta_2 \text{CONTROL variables}_{Nit} + \varepsilon_{Nit} \quad (5)$$

$$FV_{Mit} = \beta_0 + \beta_1 \text{BANK specific}_{Mit} + \beta_2 \text{CONTROL variables}_{Mit} + \varepsilon_{Mit} \quad (6)$$

In Eq. (7, 8, 9), we regress the risk variables, bank-specific variables and the control variables on firm value.

H₃: Loan Growth, Non-Performing Loans and Bank Solvency Significantly Influence the Firm Value

The third hypothesis in this study examine how loan growth, non-performing loans and solvency influences the firm value of banks. Literally, when new loans are

granted at a relatively lower rate, the average outstanding loan generates a lower interest income, suggesting that the relative interest income is expected to decrease which then reduce the value of the firm. Accordingly, commercial banks expand the magnitude of their loan to generate more earning, however, high loan growth may result in higher loan loss and thereby affecting the value of firm. This study expects a negative relationship between loan growth, NPLs and firm value, implying that a controlled and desired level of loan growth enhances profit and reduces future loan losses. Hence, since a solvent bank indicates its level of soundness, it is imperative to examine how bank capital relates to the value of firm.

RESULTS AND DISCUSSION

Descriptive Statistics

The Table 1 below summarize the descriptive statistics of the variables categorized into Nigerian and Malaysian commercial banks.

This table summarizes the mean and standard deviation of the dependent and independent variables used in the study for all the commercial banks. For the Nigerian banks, the firm value (FV) has a mean of 0.1068 (10%) while the Malaysia banks stood at 0.1108 (11%). The non-performing loan ratio of Nigerian banks has a mean of 8 per cent while the mean of Malaysian banks stood at 0.2 per cent. Furthermore, the capital adequacy ratio of Nigerian banks has a mean of 20 per cent and 16 per cent respectively for Malaysian banks. The implication is that the Nigerian banks are averagely more capitalized than the Malaysian banks. The rate of loan growth averagely stood at 16 per cent

for Nigerian banks and 10 per cent for Malaysian banks respectively. This implies that the loan growth of Nigerian banks is more rapid relative to the Malaysian banks. The average leverage ratio for Nigerian banks is 14 per cent while the Malaysian banks have negative leverage of -4 per cent. This suggests that the majority of Malaysian banks have a negative net worth which could be caused by interest on debt than the return on investment. In addition, the average efficiency ratio of Nigerian banks is 51 per cent while that of Malaysian banks is 6 per cent. This implies most Nigerian banks operates at an averagely high level of efficiency more than the Malaysia banks. The average size of Nigerian commercial banks is approximately N17 million while the average size of Malaysian banks is approximately Rm19 million respectively. The average GDP growth rate stood at 2 per cent for Nigeria and 4 per cent for Malaysia during the period of study. Finally, the average inflation rate in Nigeria is 12 per cent and 2 per cent in Malaysia. This suggests that the Nigeria economy has witnessed a rapid increase in inflation during the period of study as compared to the economy of Malaysia.

Panel Unit Roots Test

Time series data are often assumed to be non-stationary and the presence of non-stationary variables might result in spurious regression results. Therefore, the panel unit roots test was conducted in the study to check the stationary and/or the presence of unit root in the time series data in order to avoid spurious results. As shown in Table 2 below, the study use the ADF-Fisher with AIC criterion and the results indicated that majority of the variables are stationary and significant at 1st difference with intercept only.

Table 1: Summary of Descriptive Statistics

Variables	No.	All Banks Mean	SD	No.	Nigerian Mean	Banks SD	No.	Malaysian Mean	Banks SD
FV	234	0.10838	0.04828	144	0.10680	0.05283	90	0.11089	0.04010
NPL	234	0.05176	0.11585	144	0.08238	0.13931	90	0.00277	0.00304
CAR	234	0.18499	0.06435	144	0.20279	0.07594	90	0.15653	0.01566
LG	234	0.13310	0.18908	144	0.15612	0.20800	90	0.09626	0.14784
LEV	234	0.07185	0.30375	144	0.14433	0.05437	90	-0.04411	0.46336
EFF	234	0.33922	0.25728	144	0.51588	0.15256	90	0.05656	0.06792
SIZE	234	17.61066	02.66615	144	17.01952	03.15195	90	18.55649	01.08482
GDP	234	0.03168	0.02317	144	0.02199	0.01665	90	0.04717	0.02379
INFL	234	0.08122	0.05204	144	0.11788	0.02898	90	0.02255	0.00925

NOTE: FV = Firm value. CAR = Capital adequacy ratio. NPL = non-performing loan ratio. LG = loan growth. LEV = leverage. EFF = efficiency. SIZE = size of banks. GDP = growth of GDP. INFL = inflation.

Table 2: ADF Unit Root Test based on AIC Selection Criteria

Var.	NIGERIA With Intercept only			MALAYSIA With Intercept only		
	Level	1 st Diff	I(d)	Level	1 st Diff	I(d)
FV	54.6341***		I(0)	29.5983*	66.5958***	I(1)
CAR	60.8363***		I(0)	39.5409***		I(0)
NPL	90.6744***		I(0)	59.2946***		I(0)
LG	72.5767***		I(0)	40.8527***		I(0)
LEV	99.7645***		I(0)	25.9064	51.8094***	I(1)
EFF	75.1814***		I(0)	38.3040***		I(0)
SIZE	64.5516***		I(0)	57.1775***		I(0)
GDP	26.1968	97.0970***	I(1)	235.488***		I(0)
INFL	12.3888	56.7297***	I(1)	74.0486***		I(0)

Notes: t-stat = t-statistics. I(d) = integrated by the order of *d*. FV = firm value. FV = Firm value. CAR = Capital adequacy ratio. NPL = non-performing loan ratio. LG = loan growth. LEV = leverage. EFF = efficiency. SIZE = size of banks. GDP = growth of GDP. INFL = inflation. The null hypotheses shows that the data are non-stationary, or contains a unit root. ***, **, * indicate significant at 1%, 5% and 10% level respectively.

Panel Data Analysis

This study employed the panel data analysis in its estimation which indicates a special technique that accounts for the time-series and cross-sectional dimension of the dataset. Additionally, a diagnostic test was also conducted before proceeding to test panel regression models. The variance inflation factor results indicate the absence of multicollinearity in the models since the coefficient of VIF is less than 10 and the mean is less than 5 (Hair *et al*, 2006) and any autocorrelation and heteroskedasticity problem was treated accordingly.

Empirical Result with NPL as the Dependent Variable

Table 3 exhibits the coefficients estimates of the analysis for the aggregate data of all banks and the disaggregate data of Nigerian and Malaysian banks testing whether loan growth contributes to non-performing loan in banks. The Nigerian banks consist of 144 observation on 16 banks while the Malaysian banks consist of 90 observations of 10 banks.

The empirical model 1 shows that loan growth has a negative and significant impact on the non-performing loan ratio. This suggests that a decrease in loan growth by 1%, non-performing loans of banks will improve by around 56%, *ceteris paribus*. Several studies suggest that an increase in lending activities leads to a rise in non-performing loans in the future (Salas & Saurina, 2002; Kraft & Jankov, 2005; Foos *et al*. 2010). They observed that competition among banks, maximization

of short-term profit by managers cause an upsurge in non-performing loans. On the other hand, the inflation rate has a weak positive and significant influence on non-performing loan. This relation suggests that higher inflation triggers financial distress and bad loan growth (Hutchison, 2002; Domac and Martinez-Peria, 2003). Other variables are found to have no significant relationship with the non-performing loan ratio.

The empirical model 2 indicates a negative and significant relationship between loan growth and non-performing loans in Nigeria. This implies that a decrease in loan growth by 1%, non-performing loans of banks will improve by around 7%, *ceteris paribus*. Some empirical studies such as Cottarelli *et al*. (2005) suggests that non-performing loans increase when banks engage in aggressive lending activities and explicates that a favourable economic environment could be one of the main causes of increase in NPLs. Furthermore, leverage, bank size is found to have a positive and significant relationship with NPLs at 1% significance level. This suggest that increase in NPLs create avenue for balance sheet expansion and liquidity generation. Also, efficiency ratio is found to have a positive and significant relationship with NPLs at 1% significance level. Suggesting that 1% increase in operating cost will increase NPLs by around 6%. This implies that the extensive lending activities of banks increases the loan loss provision and as such, aggressive lending increases the costs of bank.

The bank size is found to have a positive and significant relationship with NPLs at 1% significance

Table 3: Result with Non-Performing Loan as Dependent Variable

	All Banks Model 1		Nigeria Banks Model 2		Malaysia Banks Model 3	
	Coef.	t-stats	Coef.	t-stats	Coef	t-stats
LG	-0.5673	-2.48**	-0.0685	-1.73*	0.0011	0.68
LEV	0.0377	0.11	0.4733	2.53***	-0.0019	-1.93**
EFF	0.5066	1.25	0.0593	2.76***	0.0273	2.26**
SIZE	-29.4812	-1.18	0.0573	3.55***	0.0208	5.10***
GDP	0.0439	0.85	-0.0010	-0.82	0.0059	3.77***
INFL	0.2617	2.12*	0.0232	1.92**	-0.0794	-2.28**
_cons	2.8991	0.63	0.1736	3.39	0.0609	6.22
R-sqd	0.1210		0.1913		0.2684	
Prob>F	0.0540**		0.0000***		0.0000***	
Obs.	234		144		90	
Hausman	FEM		REM		FEM	

Note: *** indicates significant at 1%, ** indicates significant at 5%, * indicates significant at 10%.

level. This implies that an increase in the assets of banks through investments and lending to individuals and corporate firms leads to rise in NPLs in Nigerian banks. Inflation is found to have a positive and significant relationship with NPLs. This is consistent with the study of Kashif, Iftikhar and Iftikhar (2016) who also found a positive relation. The GDP growth has no significant relationship with NPLs. The empirical model 3 reveals that loan growth has no significant relationship with NPLs for Malaysian banks. However, leverage has a negative and significant relationship with NPLs for Malaysia banks, implying that decrease in leverage ratio will increase non-performing loans ratio and thereby leading to barriers in balance sheet expansion and access to liquidity.

Similarly, the efficiency ratio has a significant positive relationship with NPLs at 1% significance level, which implies that an increase in efficiency by 1% will increase NPLs by around 3%, *ceteris paribus*. The implication is that aggressive lending activities simultaneously increases fixed expenses and costs associated with the rise in non-performing loans ratio. Furthermore, the bank size, GDP growth and the inflation rate have a positive and significant relationship with NPLs. This implies that an increase in bank size, growth in GDP and rate of inflation, NPLs increases simultaneously. This suggests that an increase in the assets of banks through extensive lending to key players' results in a rise in future loan losses.

Empirical Result with CAR as the Dependent Variable

Table 4 reports the coefficients estimates of the analysis for the aggregate data of all banks and the disaggregate data of Nigerian and Malaysian banks with capital adequacy ratio as the dependent variable.

The empirical model 4 shows that the non-performing loans ratio has a positive and significant relationship with solvency. This implies that a 1% improvement in NPLs will increase the solvency of banks by around 18%, *ceteris paribus*. Efficient loan control, stable and vibrant balance sheets encourage banks to raise income and easier access to increase their capital. Also, the loan growth is found to have a positive and significant relationship with solvency at a 10% significance level. This suggests that a 1% improvement in loan growth will increase the solvency of banks by around 6%, *ceteris paribus*. This indicates that the accessibility of borrowers to easier credit transforms into an increase in solvency as a result of interest realized. This finding is contrary to the study of Baradwaj *et al.* (2014) and Messai and Jouini, (2013) who found an indirect relationship. The leverage ratio has a significant positive relationship with solvency at a 5% significance level. This suggests that a 1% improvement in leverage will increase the solvency of banks by around 35%, *ceteris paribus*, indicating that when banks focus on equity financing, a higher ratio of equity to assets leads to an increase in the capital of

Table 4: Result with Solvency as Dependent Variable

	All Banks Model 4		Nigeria Banks Model 5		Malaysia Banks Model 6	
	Coef.	t-stats	Coef.	t-stats	Coef	t-stats
NPL	0.1865	1.92*	0.0873	27.00***	0.0366	0.06
LG	0.0587	2.00*	-0.0090	-0.82	-0.0224	-2.13**
LEV	0.3550	2.07**	0.0144	2.14**	0.0050	1.19
EFF	0.0207	0.54	-0.0019	-0.90	0.0331	1.08
SIZE	-0.4319	-0.57	-0.0093	-0.13	0.5697	2.96***
GDP	0.0020	0.90	0.3687	2.23**	-0.0926	-1.10
INFL	0.0651	0.45	0.0353	0.39	0.4717	2.10**
_cons	0.2412	1.73	0.5193	20.84	0.0449	1.26
R-sqd	0.2715		0.8675		0.1954	
Prob>F	0.0004***		0.0000***		0.0058*	
Obs.	234		144		90	
Hausman	FEM		REM		REM	

Note: *** indicates significant at 1%, ** indicates significant at 5%, * indicates significant at 10%.

banks. Hence, other variables in the model are insignificant.

The empirical model 5 indicates that NPLs has a significant and positive relationship with solvency for Nigerian banks. Suggesting that an improvement in NPLs will increase the solvency of banks by around 8%, *ceteris paribus*. This finding is contrary to the study of Baradwaj *et al.* (2014) and Messai and Jouini, (2013) who found an indirect relationship. Similarly, leverage and GDP growth has a significant positive relationship with solvency for Nigerian banks. This indicates that a 1% improvement in leverage and GDP growth will increase the solvency of Nigerian banks by around 1.4% and 36% respectively, *ceteris paribus*. The implication is that a positive economic growth, increases incomes for households and firms, enhances savings and investment capacity, thereby resulting in the ability to repay loan and increase in capital base of the banks. Thus, other variables in the model are found to be insignificant.

Furthermore, the empirical model 6 shows that loan growth has a negative and significant relationship with the solvency for Malaysian banks. This suggests that a decrease in loan growth by 1%, the solvency of Malaysian banks will improve by around 2%, *ceteris paribus*. The implication is that bad loan growth decreases the solvency of banks as the attitude towards acquiring more returns or profits makes accessibility to credit more easy for businesses and

individuals, which translate to future loan losses. The bank size is found to have a positive and significant relationship with solvency for Malaysian banks. This implies that a 1% improvement in assets of banks will increase the solvency of banks by around 56%, *ceteris paribus*. The implication is that diversification and efficient monitoring measures increases the bank size and reduce the chance of insolvency (Marijana, Curak *et al.* 2013; Baradwaj *et al.* 2014). Inflation has a positive and significant relationship with solvency, indicating that a 1% improvement in inflation will increase the capital adequacy ratio of banks by around 47%, *ceteris paribus*. The relation implies that underwriting standards deteriorate during the recessionary period and often reduces the ability of borrowers to repay loans as at when due owing to higher prices of goods. This is consistent with the study of Kashif, Iftikhar and Iftikhar (2016) who also found a positive relation.

Empirical Result with Firm Value as the Dependent Variable

Table 5 explicates the coefficients estimates of the analysis for the aggregate data of all banks and the disaggregate data of Nigerian and Malaysian banks with firm value as the dependent variable.

The empirical model 7 indicates that solvency has a positive and significant relationship with the firm value of banks. The implication is that a 1% improvement in solvency will increase the value of firm by around 3%,

Table 5: Result with Firm Value as Dependent Variable

	All Banks Model 7		Nigeria Banks Model 8		Malaysia Banks Model 9	
	Coef.	t-stats	Coef.	t-stats	Coef	t-stats
CAR	.0275	1.94*	-.1170	-2.87***	2.1660	1.90*
NPL	-.0902	-2.55**	-.1036	-1.57	.0194	0.48
LG	.0174	0.74	-.0066	-1.91**	.0976	4.22***
LEV	-.2011	-6.16***	-.2649	-3.02***	-.0202	-3.69***
EFF	-.0331	-2.02*	-.0834	-2.00**	.3151	4.62***
SIZE	.2791	2.36**	-.4661	-4.44**	1.1863	2.58***
GDP	-.3898	-3.47***	-.0025	-1.58	.4016	2.05**
INFL	-.1108	-0.86	.0004	0.04	-.0485	-2.39**
_cons	.1478	4.87	-.1563	-2.40	-.2207	-1.75
R-sqd	0.2726		0.3576		0.3553	
Prob>F	0.0000***		0.0000***		0.0000***	
Obs.	234		144		90	
Hausman	FEM		REM		FEM	

Note: *** indicates significant at 1%, ** indicates significant at 5%, * indicates significant at 10%.

ceteris paribus. This suggests that an increase in the capital adequacy ratio will lower the need for external funding and improve the value of firm. This is contrary to the study by Akram (2012) who found an insignificant relationship. The non-performing loan has a negative and significant effect on the value of firm. This suggests that a decrease in non-performing loan by 1%, firm value will improve by approximately 9%, *ceteris paribus*. The implication is that the more banks are exposed to high risk of non-performing credit and financing, the more financing loss provision will be recorded. Hence, the value of firm improves with lesser exposure of banks to credit risk. This is consistent with the findings by Jia and Chen (2008) who also found a significant negative relationship and contrary to the findings of Ayako and Wamalwa (2015) and Akram (2012) who found an insignificant relationship.

Furthermore, leverage has a significant negative effect on firm value at 1% significance level. Implying that a decrease in leverage by 1%, the value of firm will increase by around 20%, *ceteris paribus*. This suggests that for firm value to improve, commercial banks have to reduce negative net worth caused as a result of higher interest on debt than its return on investment. This finding is consistent with the study of Kommunuri, Narayan, Wheaton and Jandug (2015), Tahir and Razali (2011) who found a significant negative relationship. Also, efficiency has a significant negative effect on the value of firm. This suggest that a

decrease in efficiency by 1%, firm value will improve by approximately 3%, *ceteris paribus*. This indicates that lowering of operating cost and redundancy in business operations will enhance operating profit and improve firm value. This finding is contrary to the study of Akram (2012) who found an insignificant relationship.

Additionally, bank size has a significant positive effect on the value of firm. This implies that a 1% improvement in bank size will increase firm value by approximately 28%, *ceteris paribus*. This finding is supported by evidence from studies such as Tingbani (2015) and Kommunuri, Narayan, Wheaton, & Jandug (2015). On the contrary, the GDP growth has a significant negative relationship with firm value. This suggests that a decrease in GDP by 1%, the value of firm will improve by around 38%, *ceteris paribus*. This is contrary to the findings of (Campello *et al.*, 2012; Zariyawati, 2009) who found a significant positive relationship. Thus, loan growth and the rate of inflation has no significant effect on firm value.

The empirical model 8 for Nigerian banks shows that solvency has a significant negative relationship with the value of firm at 1% significance level. This suggests that a decrease in capital adequacy ratio by 1%, firm value improve by around 11%, *ceteris paribus*. This suggests that a decrease in the capital adequacy ratio will increase the need for external funding, increases the banks cost of funding and risks and

thereby decreasing the value of firm. This is contrary to the study by Akram (2012) who found an insignificant relationship. The results indicate that loan growth has a negative and significant effect on the value of firm 5% significance level. This implies that a decrease in loan growth by 1%, firm value will improve approximately by 1%, *ceteris paribus*. This suggests that a decrease in bad loan growth in the Nigerian banks and controlled credit accessibility by businesses and corporate individuals will help improve the firm value.

Furthermore, leverage has a negative and significant effect on the value of the firm. This implies that a decrease in leverage 1%, the value of firm will improve by approximately 26%, *ceteris paribus*. This finding is consistent with the study of Kommunuri, Narayan, Wheaton and Jandug (2015), Tahir and Razali (2011) who found a significant negative relationship. Also, efficiency has a negative and significant effect on the value of firm. This implies that a decrease in efficiency by 1%, the value of firm will improve by approximately 8%, *ceteris paribus*. The bank size has a negative and significant effect on the value of firm. This implies that a decrease in bank size by 1%, the value of firm will improve approximately by 46%, *ceteris paribus*. This finding is contrary to the studies such as (Tingbani, 2015; Kommunuri, Narayan, Wheaton & Jandug 2015) who found a significant positive relationship.

The empirical model 9 indicates the solvency has a positive and significant relationship with the value of firm for Malaysian banks. Implying that a 1% improvement in solvency will increase firm value by approximately 216%, *ceteris paribus*. This suggests that an increase in the capital adequacy ratio will lower the need for external funding and improve the value of firm. This is contrary to the study by Akram (2012) who found an insignificant relationship. Loan growth has a significant positive effect on firm value at 1% significance level. This implies that a 1% improvement in loan growth will increase firm value by around 9%, *ceteris paribus*. Thus suggest that a stable, vibrant and well managed balance sheets encourage banks to raise income through controlled loan growth. Furthermore, leverage has a significant negative effect on the value of firm and implies that a decrease in leverage by 1%, firm value will increase by around 2%. This suggests that in order to improve firm value, commercial banks have to reduce their negative net worth caused as a result of higher interest on debt than its return on investment. This finding is consistent with the study of Tahir and Razali (2011).

Efficiency has a significant positive effect on firm value of banks, and this suggest that a 1% improvement in efficiency will increase firm value by approximately 31%, *ceteris paribus*. This suggest that when banks engage in extensive business activities through conventional lending to individuals and corporate firms, the value of firm improve. This is consistent with the studies of (Tingbani, 2015; Kommunuri, Narayan, Wheaton, & Jandug, 2015). The bank size and GDP is found to have a significant positive effect on firm value. This suggests that a 1% improvement in bank size and GDP will improve firm value by approximately 118% and 40% respectively. This is consistent with the theoretical expectation that suggests that larger banks are more valued compared to smaller banks since larger banks have the advantage of economies of scale which helps to improve their firm value. This consistent with prior studies such as Tingbani (2015), Campello *et al.* (2012) and Zariyawati *et al.* (2009). Finally, the relationship between the inflation rate and firm value is negatively significant for Malaysia banks. Implying that a decrease in inflation by 1%, firm value will improve approximately by around 22%, *ceteris paribus*.

CONCLUSION

The aftermath of the banking structure reforms in the mid-2000s couple with the period of favourable economic growth in Nigeria led to a massive lending boom to the private sector. The expansion opportunities for business, extensive competition among banks and technological advancement all creates a platform for widespread loan supply to borrowers. This article examines whether loan growth enhance the volume of non-performing loans, investigates the effect of non-performing loans and loan growth on bank solvency and also explores the effect of non-performing loans, loan growth and bank solvency on firm value in the Nigerian and Malaysian banking sector. The method used in the study is a panel data estimation with time-series of 9-years covering 2009 to 2017 and cross-sections of 26 commercial banks. To the best of our knowledge this study is the first to assess the impact of credit risk factors like loan growth, non-performing loans, bank solvency and firm value as a comparative study. The findings of this research study are valuable for managers, investors, analysts and for scholars.

This research raises important issues on the role of credit growth and how it can possibly enhance the volume of non-performing credit in the banking sector

under the influence of other important macroeconomic indicators such as GDP growth and inflation. Therefore, the empirical results for all the banks indicate that loan growth has a significant negative relationship with NPLs while inflation has a significant positive relationship with NPLs. Other variables in the model were insignificant. The findings of the study for the Nigerian banks shows that loan growth has a significant negative relationship with NPLs as hypothesized in the study while leverage, efficiency, size and inflation all have a positive significant relationship with the non-performing loan. GDP is found to have no significant relationship with NPLs. In addition, the empirical result for Malaysian banks indicates that leverage and inflation have a significant negative relationship with NPLs while efficiency, bank size and GDP growth all have a positive significant relationship with NPLs. The loan growth is found to be insignificant for Malaysian banks.

This study also examined the influence of loan growth and NPLs on bank solvency and the empirical result for all the banks shows that NPLs, loan growth and leverage all have a positive and significant impact on bank solvency. Other variables in the model were found to be insignificant. The empirical results for Nigerian banks explicates that NPLs, leverage and bank size have a significant positive relationship with bank solvency while other variables in the model remain insignificant. Furthermore, the results for Malaysian banks indicate that loan growth has a positive and significant influence on bank solvency while bank size and inflation have a negative and significant relationship with bank solvency. Other variables such as NPLs, leverage, efficiency and GDP growth in the model have no significant effect. Finally, the effect of non-performing loans, loan growth and bank solvency on the value of firm for all the banks explicate that NPLs and bank size have a significant positive relationship with the value of firm while capital adequacy ratio, leverage, efficiency and GDP have a negative and significant impact on firm value. Hence, loan growth and inflation are found to have no significant effect on firm value.

Furthermore, the empirical results for Nigerian banks indicate that NPLs, loan growth, leverage, efficiency and bank size have a negative and significant effect on the value of firm. However, the capital adequacy ratio, GDP growth and inflation have no significant impact on firm value. Additionally, NPLs, loan growth, efficiency, bank size and GDP have a positive and significant impact on the value of firm for

Malaysian Banks while leverage and inflation is found to have a significant negative effect on firm value. Thus, the capital adequacy ratio is found to have no significant influence on firm value of Malaysian banks. Conclusively, this study posit that commercial banks are massively vulnerable to abnormal loan growth which leads to an upsurge in bad loan losses as a result of weak prudential regulations and supervision and thereby affecting bank solvency and the value of firm. Recommendation for future studies suggest that further research can explore the interactions between loan growth and NPLs, loan loss provision and loan growth on profitability and the value of firm. Moreover, future study can also control for variables such as Herfindahl-Hirschman Index, industry concentration and diversification and the possible role of other macroeconomic variables such as unemployment, the rule of law and government change that might have a significant effect on the value of firm.

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