MACRO-PRUDENTIAL POLICY INSTRUMENTS, PRO-CYCLICALITY OF CAPITAL AND BANK LENDING IN NIGERIA: FROM POST GLOBAL FINANCIAL CRISIS

Onyebuchi Iwegbu
Department of Economics,
Faculty of Social Sciences
University of Lagos, Akoka, Lagos, Nigeria
Phone: +2348080668000
Email: oiwegbu@unilag.edu.ng

Ernest Simeon O. Odior, PhD
Department of Economics,
Faculty of Social Sciences
University of Lagos, Akoka, Lagos, Nigeria
Phone: +23480-62088200; +2347058074040
Email: odiore@yahoo.com; eodior@unilag.edu.ng

ABSTRACT

This study empirically examined the tendency of macro-prudential policy in reducing the pro-cyclicality between Nigeria banks' capital and bank loans during the post global financial crisis. The study employed the ARDL Model in estimating the model specified. The study found that macro-prudential policies help in reducing the procyclicality between bank loans and the extent of capital available for banks. And this is found to be less effective during the crisis than when the financial industry is not in crisis. Also, in the short run, capital and bank loans are countercyclical in nature and however this is reversed in the long run. The policy implication of this study is that the regulatory authority's macro-prudential policy is effective in reducing the procyclicality between banks loans and capital adequacy of banks. Also, short term crisis does not deter banks from issuing out loans, however, in the long run, loans are greatly affected by the crisis within the system. There is a need for policymakers and the regulatory authority to focus attention on regulatory capital framework so that macro-prudential policies will have a greater impact in reducing the credit growth procyclicality and strengthen their macro-prudential supervision measures especially during the period of crisis.

Keywords: Macro-prudential Policy Instruments, Bank's Capital, Bank Loans, ARDL

JEL Classification: E58, G28

INTRODUCTION

The capital base of banks especially for deposit money banks plays a significant role in banking operations as well as its financial stability. Theoretical literature abounds (Labonne & Lame, 2014; Olszak, Pipień, Kowalska & Roszkowska, 2015) that higher capital adequacy of banks increase their financial prowess and thus, also increases their lending ability. More also, the banks' capital requirements play two significant roles. First is that it helps to act as a buffer in absorbing potential losses that may occur due to financial crunches coming from internal or external shocks. Second is that the capital requirement acts as a regulatory framework in the control of money in circulation. Questions on the first purpose have been raised of recent after the global financial crisis of 2008.

The Central Bank of Nigeria under her Guidance notes on regulatory framework maintains that a minimum regulatory capital adequacy ratio (CAR) of 15% will be applicable to banks with international authorisation and Systemically Important Banks (SIBs) while a CAR of 10% will be applicable to other banks. Immediately after the global crisis of 2008, the capital adequacy ratio of banks collapsed as the Nigerian banking sector were also the recipient of the external shock arising from the financial crisis. Figure 1 shows that from 21.9% of capital adequacy ratio recorded in 2008, it fell to 4.1% in 2009 and this deepened in 2010 to 1.8%. The shocks to the bank's capital base have been adjudged to be a key determinant of bank's lending behavior and this is procyclical in nature (Kishan & Opiela, 2006). Evidently, during this period, the lending ability of banks have been greatly affected as well as increasing the systemic risks associated with banking behaviours. After 2010, there was a capital adequacy recovery as it went up to 17% in 2011 but declined in 2017 to 10.2%. A major conclusion that can be drawn from this trend is that the aftermath of the global financial crisis has kept the capital adequacy ratio of banks below the pre-global financial crisis for a decade now.
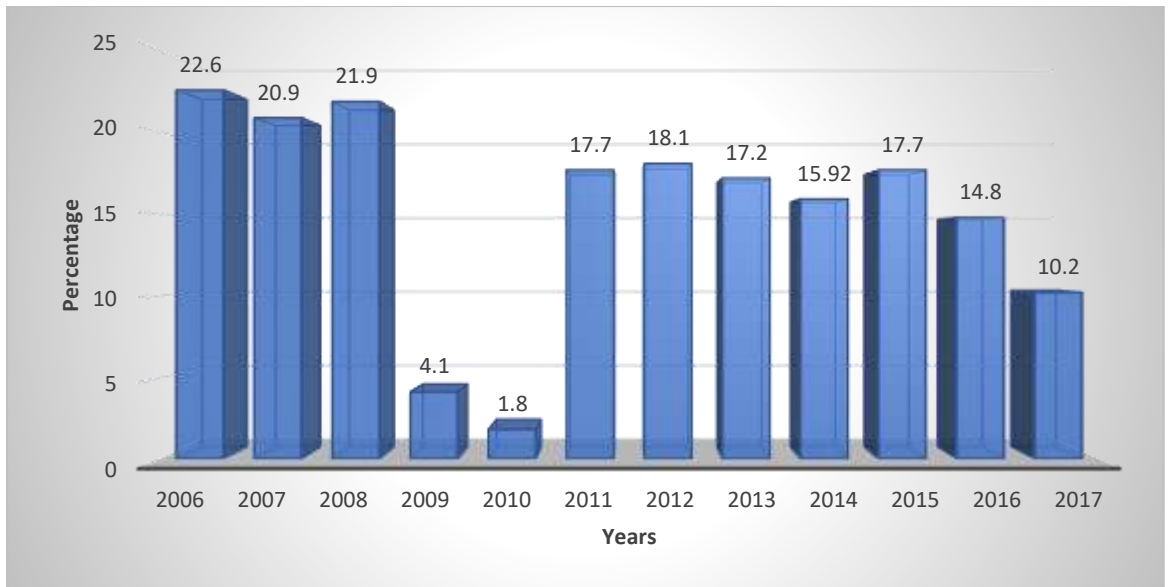
Source: Census and Economic Information Center, (2019)

Fig. 1: Capital Adequacy Ratio of Commercial Banks in Nigeria

Macro-prudential Policies are the strategies and policies taken by the regulatory authorities of an economy in managing all the possible risks that are associated with the financial system as well as its operations; this will ensure that risks, shocks or crisis that are likely to occur are mitigated (International Monetary Fund, 2013; Viñals, 2011). With the global financial crisis, policymakers and monetary experts opine that new macro-prudential policy instruments have the tendency to reduce the procyclical nature of banks' capital cum lending rate. Increased resilience of the banking sector implies that banks are able to absorb losses which are of greater consequences arising from their ability to accumulate higher capitals or have access to better funding. Whichever case, this will ultimately reduce the tendency to experience a costly disruption in the supply of credit (Olszak, Roszkowska & Kowalska, 2019).

The Central Bank of Nigeria also pays attention to the macro-prudential regulations under the financial stability reference unit. The regulatory authority (CBN) has adopted some financial soundness indicators in monitoring the financial stability of the whole banks and as thus, those financial soundness indicators are all pointers to how well macro-prudential regulations are effective in monitoring and avoiding systemic risk. In all, there are asset-based indicators comprising of the ratio of non-performing loans to total loans, core liquid assets to total assets and liquid assets to short term liabilities. The capital-based indicators are the ratio of regulatory capital to risk-weighted assets, the ratio of tier one capital to risk-weighted assets. Lastly, the income and expenses-based indicators are ratio of interest margin to gross income, personnel costs to non-interest expenses and then the ratio of non-interest expenses to gross income (Muo, 2012).

The MPIs are set of regulations and policy adherence measures to ensure financial stability within banking operations. The macro-prudential policy has a short-term objective of preventing financial distress from spreading while its long term-objective is on preventing the costs of systemic crises in the economy. The risk nature focuses on collective behavior among financial institutions and follows a top-down approach in dealing with systemic risk (Zulkhibri, 2018).

Most times, those banks that do not have adequate capital always suffers crisis during recession and period of financial crunches. Most works have been conducted in examining the extent of such crisis since the first Basel Accord was introduced as an international capital standard. However, the micro-prudential policy measures are insufficient in controlling these crises both in developed and developing economies like Nigeria. Researchers and policymakers thus argue that the macro-prudential approach towards regulation and supervision will likely reduce the procyclicality which banks suffer. It is against this backdrop that this study seeks to examine the interactive effect

of macro-prudential policy instruments and capital adequacy ratio on bank loans. That is, this study seeks to answer the question, does the use of macro-prudential policy instruments in Nigeria impacts on the link thereby reducing the procyclicality between loans growth and capital adequacy ratio of banks in Nigeria? The relevant hypothesis to test in this paper is that macro-prudential policy instrument does not reduce the procyclicality between loans growth and capital adequacy ratio in Nigeria from the post-global financial crisis period to 4th Quarter, 2018.

Empirically, studies including Goujon and Sawadogo (2016); Fan and Keregero (2017), have examined the relevance of macro-prudential policy measures on financial stability in selected low income countries and Nigeria respectively; however, there is scanty literature on how macro-prudential policy instruments can interact with capital availability ratio to affect the credit lending capacity of banks in Nigeria most especially in the aftermath of the global financial crisis; to the best of our knowledge, no extant empirical studies have conducted this using Nigeria as a case study; the closest was the one conducted in Africa was the one done by Guérineau, Goujon and Sawadogo (2016) for WAEMU region. This study will also be different as it will incorporate all the macro-prudential policy measures into a single index called macro-prudential policy index using the principal component analysis.

REVIEW OF RELEVANT LITERATURE

The macro-prudential policy approach has become imperative since the occurrence of the global financial crisis of 2008. With this crisis, the regulatory authority has shifted away their attention from the micro-prudential policy approach to a more robust and encompassing; macro-prudential approach. The micro-prudential policy approach is majorly concerned with the individual institution's financial stance by taking up individual supervisory measures in ensuring that the individual risks are controlled

and avoided. The regulation in micro-prudential approach is partial equilibrium (Duniya, 2012); that is, it aims at preventing an overbearing financial failure that can be attributed to an individual financial institution.

There are various strands of theoretical insight that provides an explanation of how macro-prudential policy can affect the cyclicality between loans and capital ratio. Notably, we start with the agency paradigm. The agency theory emphasizes the relationship that exists between the principal and the agent. The agents act on behalf of the principal and receive an agent commission. The agent takes a different form depending on the institution they find themselves. In this context, the agent is the management board of financial institutions and the principal is the shareholders. Most times, the agents do not act in the interest of the principal and leading to moral hazard as such, there can be a financial crisis with respect to the particular financial institution (Duniya, 2012).

Another theory that is making the light of the day is the externalities paradigm. According to Greenwald and Stiglitz (1986) who championed this theoretical strand of literature, externalities explains the situation when financial crisis from one bank or financial institution cause emission of bad signals to other sectors of the economy and can only be mitigated if there is an effective macro-prudential policy. As established in the literature, an externality is the emission of a signal from one economic agent's action on the other economic agent. That is, it is the attendant consequences of one's action on the other person within an economic space. The monetary externality is that externality that arises when one economic agent's action emits a signal on the welfare of another economic agent through effects on prices. Distortions in the market can be the case when the agents face borrowing constraint; that is decline in loans growth rate by commercial banks or existence of financial frictions (especially during financial crisis) or the, this, therefore, results into pecuniary externalities such as various market distortions in the

form of excessive risk-taking, excessive levels of short-term debts and over borrowing (Duniya, 2012).

Another theoretical construct that is pronounced in literature is the mood swings paradigm. This theory places attention to the behavior of the managers. In light of this theory, rationality, as well as greed, are core influencing factors that affect the behavior of managers in the financial institutions. The rationality and greed cause a mood swing in the optimistic behavior of the managers thereby making them be over-optimistic in good times and sudden risk retrenchment on crisis period. Thus, pricing signals in the financial market may be inefficient and his increases the chances of systemic trouble. Thus, there is a need to have managers who are forward-looking as well as having macro-prudential supervisors that will help in moderating uncertainties and informing the regulatory authorities in terms of crisis and risks. This theory can be applied when examining the effectiveness of macro-prudential policy measures at the firm level.

Olszak, Roszkowska, and Kowalska (2019) examined the tendency of macro-prudential policies in reducing the procyclicality of capital ratio on bank lending in 60 countries. Their study employed the system Generalized Methods of Moments to examine the extent and possibility with a focus on examining its potency during the economic crisis as well as whether the size of banks plays a significant role. The studies found that macro-prudential policies play a significant role in reducing the cyclicality of bank lending and capital, even during the period of the financial crisis as well as its effect on large banks

Fan, Keregero and Gao (2017) investigated how macro-prudential capital requirements affect systemic risk in Nigeria. The study acknowledges that amongst other risks, the capital requirement is one of the major risks that affect the stability of banks. Owing to this, their study dedicated attention to understanding the role which macro-prudential capital requirement plays in managing the risk. The study employed vector

autoregression analysis and the results from the findings indicated that when there is no financial crisis, more of the capitals are owned and however, in the time of shocks in the form of crisis, banks hold little capital for risk allocations. Also, there are studies that have examined the relationship between credit and the level of banks' capital. Notable is the studies of Labonne and Lame (2014) who investigated the relationship between credit growth and bank capital requirements in France for the period 2003 and 2011. The study employed the panel data regression technique. Their findings reveal that there exists a procyclical relationship between capital and credits given out.

Ayyagari, Beck, and Peria (2018) studied the micro impact of macro-prudential policies on firm level by examining over 900,000 firms between the periods 2003 and 2011 in 48 countries across Europe and South America. The study used panel data estimation technique and the result found that macro-prudential policies were effective in reducing the credit growth of micro, medium and small-scale enterprises. Also, the study shows that young firms within the country are greatly influenced with lower credit growth with macro-prudential policies in place; implying that the policy is effective for financial stability.

For Indonesia, Alegria, Alfaro and Cordova (2017); Claessens and Kose (2013); Zhang and Zoli (2016); Pramono Hafidz, Maulana, Muhajir, Alim, Adamanti and Alim (2015); Purnawan and Nasir (2015) and Fendoğlu (2017) found that macro-prudential policy measures are effective in reducing the risk systemic credit growth in emerging markets using probit regression and Generalised Method of Moment. In all of these studies to the best of our knowledge, none has been done in the context of Nigeria.

RESEARCH METHODOLOGY AND THEORETICAL FRAMEWORK

Distortions in the market can be the case when the agents face borrowing constraint; that is decline in loans growth rate by commercial banks or existence of financial frictions (especially during financial crisis); this, therefore, results into pecuniary externalities such as various market distortions in the form of excessive risk-taking, excessive levels of short-term debts and over borrowing (Duniya, 2012). Hence, we have it that:

$$Loans\ Growth = f\,(capital\ adequacy\ deline : excessive - risk, over\ borrowing)\qquad(1)$$

According to International Monetary Fund Policy (2010), this risk externality which arises between the financial institutions and from them to the real economy triggers market failure and this will then justify the need for macro-prudential policies. Thus, the macro-prudential policies will act as a preventive independent agent in mitigating externalities arising from the financial crisis. To represent this in a more detailed chart, Figure 2 will lend credence.
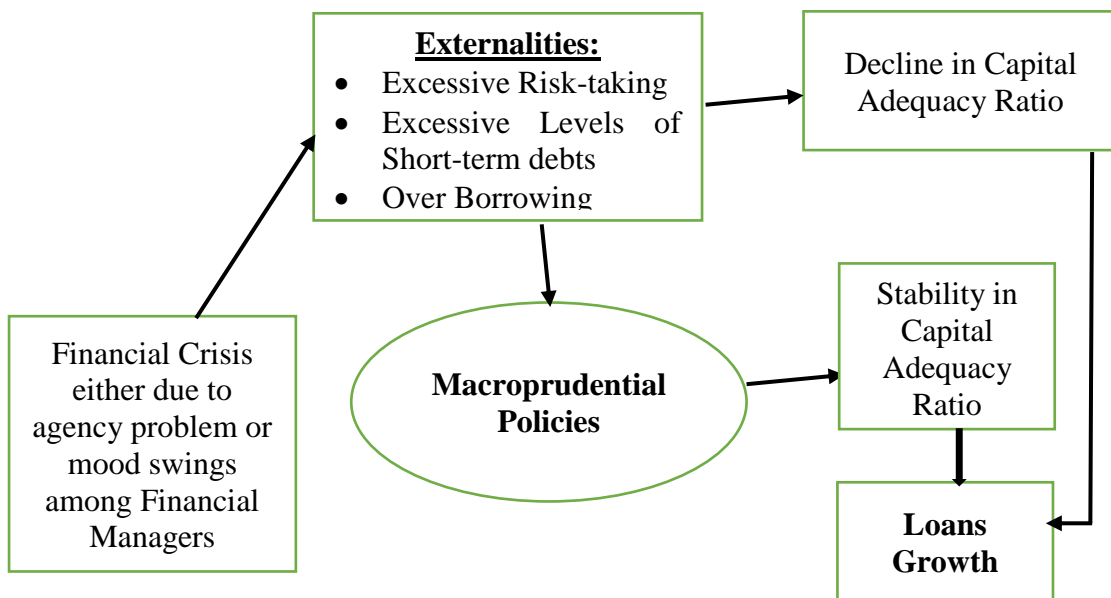
Source: Authors' Construct

Figure 2: Macro-prudential Policies Intermediating between Externalities, Capital Adequacy Ratio, and Loans Growth

Modeling the determinants of bank loans can be somewhat difficult especially during crisis period, this owes to the fact that during the period and post -experiences, not only the loan supply will decline, but also the loans demanded by households arising from bank's liquidity as well as capital crunches. Olszak et. al. (2019) examined the effectiveness of macro-prudential policy instruments in reducing the procyclicality of capital ratio and bank lending rate. The early studies of Olszak et. al. (2019) developed the following functional relationship between loans, capital ratio and the macro-prudential policy instruments:

Loans = f(Capital Ratio, Capital ratio*crisis, Macroprud, Macroprud*crisis,

Macroprud*Capital ratio, Macroprud*Capital ratio*crisis)   (2)

Where loans are the loans rate deflated with the consumer price index, capital ratio is the capital adequacy rate as defined in the Basel I agreement, the crisis is the dummy variable for periods of crisis. Our studies modify equation (2) and extend to include other factors that could determine the loans growth such as the extent of investment in the economy, exchange rate policies which are very applicable to a developing country that is heavily dependent on import. Thus, equation (2) is transformed into an Autoregressive Distributed Lag Model of p order as presented in equation (3).

$$\Delta Loans = \beta_0 + \beta_1 CAP_t + \beta_2 MPI_t + \beta_3 crisis_t + \beta_4 CAP_t * MPI_t + \beta_5 CAP_t * MPI_t * crisis_t$$

$$+ \beta_6 INV_t + \beta_7 EXCH_t + \beta_8 \sum_{i=1}^{p} \Delta CAP_{t-i} + \beta_9 \sum_{i=1}^{p} \Delta MPI_{t-i} + \beta_{10} \sum_{i=1}^{p} \Delta crisis_{t-i}$$

$$+ \beta_{11} \sum_{i=1}^{p} \Delta CAP_{t-i} * \Delta MPI_{t-i} + \beta_{12} \sum_{i=1}^{p} \Delta CAP_{t-i} * \Delta MPI_{t-i} * \Delta crisis_{t-i} + \beta_{13} \sum_{i=1}^{p} \Delta INV_{t-i}$$

$$+ \beta_{14} \sum_{i=1}^{p} \Delta EXCH_{t-i} + \varepsilon_t$$

(3)

The macro-prudential index is estimated using a principal component analysis on all the macro-prudential indicators used. Broadly, the most commonly used macro-prudential policy indicators (MPIs) include tools to address threats to financial stability that may

arise from excessive credit expansion and asset price booms (dynamic capital buffers, dynamic provisions, loan-to-value (LTV), debt service-to-income, reserve requirements, ceilings on credits); tools to address core amplification mechanisms to systemic risk due to leverage (caps on foreign currency lending, limits on net open currency positions, levy on non-core funding); tools to avoid structural vulnerabilities in the financial system and reduce systemic spillovers with respect to stress and then infrastructural policies (disclosure policy for markets as well as institutions that are targeting systemic risk and resolution requirements for SIFIs) (IMF, 2011; Financial Stability Board, FSB, 2011; Bank for International Settlement, BIS, 2011). IMF classification noted also that there are core indicators that are applicable to most economies and then encouraged indicators.

However, Selialia, Mbeleki, and Matlapeng (2010) elucidated three main approaches of identifying MPIs, these are following the standards established by international organisations (IMF, 2011; Financial Stability Board, FSB, 2011; Bank for International Settlement, BIS, 2011). following the underpinning economic theories of financial instability (monetary approach, risk of bank runs, uncertainty, credit rationing and asymmetrical information and theories of financial fragility) and the third approach is the interactions between the financial sector and other sectors of the economy. This follows that indicators used in measuring financial instability can serve as proxy for MPIs although they are a little different in that financial instability measures covers the whole economy while MPIs covers other parts of the economy as counterparties to the financial sector, then MPIs were fallout from the 1980s, 1990s crisis, and financial instability indicators are fallout from the EU integration (Muo, 2012). IMF (2011) guide have greatly narrowed the two indicators and can thus be used interchangeably and also given that both measures have the same goal. Selialia et. al. (2010) also noted that there should be sensible basis for choosing an indicator, be empirically robust and such indicator must have a strong relationship with financial instability as well as have predictive powers.

This study thus follows the second approach of determining the MPIs by using the measures of financial stability as defined by the financial stability and financial policy regulation department of CBN. Thus, following Muo (2012), the Macro-prudential Policy Indicators employed are ratio of non-performing loans to total loans, core liquid assets to total assets, liquid assets to short term liabilities, ratio of regulatory capital to risk-weighted assets, ratio of tier one capital to risk-weighted assets, ratio of interest margin to gross income, personnel costs to non-interest expenses and then the ratio of non-interest expenses to gross income.

DATA SOURCES

The measures of the macro-prudential policy instruments in the Nigeria context is sourced from the framework as provided by CBN (2012). Quarterly data spanning from the first quarter of 2007 till the fourth quarter of 2018, 48 data points is employed.

Table 1: Measures, Sources and Appriori Expectations of Variables Employed

Variable	Definition	Measures	Appriori Expectation	Source
Loans	Loans growth at time t	Changes in the total loans made by commercial banks.	Dependent Variable	CBN, 2018 4th Quarter Bulletin
CAP_t	Capital ratio at time t	Capital ratio defined by total equity divided by total assets.	(+)	CBN, 2018 4th Quarter Bulletin
MPI_t	Macro-prudential Policy Index at time t.	Derived from Principal component analysis of the various Macro-prudential policy instruments used	(+)	CBN, 2018 Financial Soundness Indicators
$crisis_t$	Financial Crisis at time t.	Dummy variable with 1 assigned to periods which at least one commercial bank merged and 0 otherwise.	(-)	
INV_t	Investment Growth rate at time t	Gross fixed capital formation as a ratio of Gross Domestic Output	(+)	CBN, 2018 4th Quarter Bulletin
$EXCH_t$	Exchange Rate at time t.	The official rate of Nigeria naira to a dollar	(+)	CBN, 2018 4th Quarter Bulletin

Source: Authors' Construct

EMPIRICAL FINDINGS AND DISCUSSION

To estimate equations (3), the study employs the Autoregressive distributed lag model. The ARDL estimation technique is preferred and novel in estimating a short run and long run components of the model. More also, the ARDL is very much applicable in estimating models that have a different order of integration of variables, I(0) and I(1) variables. When variables are found to be non-stationary at level, one option in order to get the short run dynamic is to estimate the model by differencing the variables if these

differences are stationary. However, this method will lead to a considerable loss of long-run properties of the data. Alternatively, economic variables may be combined together in levels provided that they are co-integrated. The issue of co-integration then applies when two series are integrated after the first difference I(1), but a linear combination of them is stationary at level I(0); in this case, the regression of one on the other is not spurious, but instead, tells us something about the long-run relationship between them (Wooldridge, 2004). The study uses the Kwiatkowski-Phillips-Schmidt-Shin, KPSS (1992) unit root test statistic to examine the stationarity of the variables while the Peseran, Shin and Smith (2001) bound co-integration technique is employed in determining the co-integration of the series. The results are presented in table 2.

Table 2: Unit Root Test Result

Variables	KPSS at Level		KPSS at First Difference		Decision
	Test Statistics	5% Critical Value	Test Statistics	5% Critical Value	
CAP	0.085886	0.463000	-	-	Stationary at Level
Crisis	0.177381	0.463000	-	-	Stationary at Level
EXCH	0.737651	0.463000	0.180461	0.463000	Stationary at 1st Difference
log(INV)	0.367851	0.463000	-	-	Stationary at Level
log(LOANS)	0.841983	0.463000	0.333918	0.463000	Stationary at 1st Difference
MPI	0.186167	0.463000	-	-	Stationary at Level

*** Implies Statistically Significant at 1%, * Implies Statistically Significant at 5%*

Source: Authors Construct using Data extracted from CBN Bulletin

Examining Table 1, we can conclude that the variables CAP, crisis, log(INV) and MPI are stationary at levels as their test statistic are less than the 5% critical value thereby failing to reject the null hypothesis of the variables are stationary at level for the described variables. The null hypothesis of the variables stationary at level is rejected for EXCH and log(LOANS) and as such, the variables are further tested at first difference. The result from the first difference shows that the test statistics for the two variables are less

than the 5% critical value and we thus fail to reject the null hypothesis but conclude that the two variables are stationary at first difference. Given that the order of integration are mixed such that some of the variables are integrated at levels and others are integrated at first difference, there is a need to test for the cointegration of the variables, this is done by conducting the ARDL bound test for co-integration as explained by Pesaran, Shin and Smith (2001) which is presented in Table 3.

Table 3: ARDL Bounds Cointegration Test Result

F-statistics	Degree of Freedom	I0 Bound at 5%	I1 Bound at 5%
5.823080	7	2.32	3.5

** Implies Statistically Significant at 1%, * Implies Statistically Significant at 5%
Source: Authors Construct using Data extracted from CBN Bulletin

The ARDL Bounds cointegration test is useful for testing for cointegration of variables that are integrated at varying levels which are I(0) and I(1). It is important for cointegration to exist for there to be stability in the long run. To do this, we compare the f-statistics and the critical values at 5% for both the lower bound (I(0)) and the upper bound I(1). If the f-statistics is less than the I(0) lower bound critical value, we conclude that there is no cointegration associated with the model; if the f-statistics is above the I(1) upper bound critical value, we conclude that there is cointegration and as such, stability can be achieved in the long run. However, if the f-statistics is between the lower bound I(0) 5% critical value and the upper bound I(1) 5% critical value, the decision is inconclusive. From Table 3, we can thus see that the f-statistics is higher than the upper bound 5% critical value, hence there is cointegration associated with the regression result. Having identified that there is co-integration, we proceed to estimate the Autoregressive Distributed Lag Model (ARDL).

Table 4: ARDL) Result: Dependent Variable: Δlog(LOANS)$_{t-1}$

	Long Run				Short Run		
Variable	**Coefficient**	**t-Stat**	**Prob.**	**Variable**	**Coefficient**	**t-Stat**	**Prob.**
CAP$_t$	0.008084**	3.31	0.0012	Δlog(LOANS)$_{t-1}$	-0.339855‡	-2.02	0.0541
MPI$_t$	0.368113	0.72	0.4785	ΔCAP$_t$	-0.003856	-0.82	0.4177
CRISIS$_t$	0.355815	1.43	0.1649	ΔCAP$_{t-1}$	-0.006528*	-2.10	0.0457
CAP*MPI$_t$	-0.009078*	-2.34	0.0394	ΔMPI$_t$	-0.049414	-0.80	0.4324
CAP*MPI*		-2.14					
CRISIS$_t$	-0.008251*		0.0257	ΔCRISIS$_t$	-0.018025**	-3.80	0.0006
LOG(INV)$_t$	-0.53469**	-2.82	0.0093	ΔCRISIS$_{t-1}$	-0.049695‡	-1.79	0.0862
EXCH$_t$	0.000746	0.36	0.7189	Δ(CAP*MPI)$_t$	0.003342	0.99	0.3294
		7.56		ΔCAP*CRISIS*		-3.17	
C	13.63877**		0.0000	MPI$_t$	-0.001262**		0.0071
				Δlog(INV)$_t$	0.054217	1.51	0.1445
				Δlog(INV)$_{t-1}$	0.063227	1.62	0.1175
				ΔEXCH$_t$	0.001419*	2.54	0.0175
				CointEq$_{t-1}$	-0.152996**	-3.06	0.0052

Diagnostic Test Result				
R-squared	0.993356	BG f-Stat	1.643464	
Adjusted R-squared	0.988572	BG f-Prob	0.2152	
F-statistic	207.6496**	J-B stat	14.645**	
Prob(F-statistic)	0.000000	J-B Prob	0.0007	
Durbin-Watson stat	2.358870	AIC Model Selection	(2, 2, 1, 2, 1, 0, 2, 1)	
Ramsey RESET f-stat	0.007180	Wald test (long run $\beta's$ χ^2_{stat})	20.80959**	
Ramsey RESET Prob.	0.9332	Wald test (long run $\beta's$ χ^2_{Prob})	0.0041	
BPG χ^2_{stat}	0.595120			
BPG χ^2_{Prob}	0.8702			

** *Implies Statistically Significant at 1%, * Implies Statistically Significant at 5%*
Source: Authors Construct using Data extracted from CBN Bulletin

The result from Table 4 shows that there is a negative and significant impact of macro-prudential policies interacting with capital adequacy on banks' lending rate. The implication of this is that with macro-prudential policies, the cyclicality between banks' lending and capital strength is counter. Thus, we can conclude that macro-prudential

policies reduce the procyclicality between capital and bank lending. For the period during crisis, the coefficient which is given as -0.008251 is lower than the coefficient when macro-prudential policies interact with banks' lending without crisis in absolute terms (-0.009078) and thus, it shows that the potency of macro-prudential policies in reducing the procyclicality between banks' lending and her capital is affected during crisis, although it reduces the cyclicality, but is affected during crisis. The result supports the finding of Olszak, Roszkowska and Kowalska (2019) who found that macro-prudential policies reduce the procyclicality between loans and banks' lending in 60 countries. Other relevant studies that support our findings are Labonne and Lame (2014); Gambacorta and Murcia (2018); Cerutti, Claessens and Leaven (2017). However, it is not in tandem with their findings that it is more effective during crisis. A possible reason for their findings is that the countries examined are developed countries in Europe and the Baltic nations. The implication of this is that the regulatory authority needs to be more proactive during the period of crisis so that the macro-prudential policies will be effective in reducing the procyclicality between loans and capital adequacy ratio during crisis.

We can easily analyze our results as reported in table 4. From table 4, it can be seen that there is a positive impact of capital adequacy on bank lending as this is statistically significant in the long run. However, in the short run, there is a negative impact of capital strength of the bank on bank lending which shows the countercyclicality of the relationship between bank lending and capital adequacy, although this is statistically significant at 10%. The implication of this finding is that, in the short run, shortages in the capital for banks does not deter them from giving out loans, but in the long run, banks cannot continue to buffer the shortage in the capital and thus will be procyclical in the long run.

The result shows that in the period where at least one of the banks is in crisis, its lending rate is not affected in the long run, although this is not statistically significant. However, in the short run, crisis results in a decrease in the lending rate of banks. A possible reason why in the long run, the crisis does not deter banks from lending is that the Central Bank of Nigeria has consistently taken proactive measures to counter the effect that crisis has on banking rate and the economy as a whole. Also, the management of those banks are risk lover and as such believes that lending can still create a positive externality towards the banks' recovery from the crisis. Further findings from the result show that the level of investment does not correlate with increases in loans given out by banks. However, exchange rate depreciation increases the intensity of banks' lending.

Also, the error correction term from Table 4 reveals that it is negative, statistically significant and as well as less than one. The implication of this result is that the model is well formulated and any disequilibrium that is likely to arise in the share to medium run will adjust itself and thus be corrected in the long run. Rather put, the degree of adjustment is -0.153, implying that about 15.3% of the disequilibrium is corrected in the long run. The result also shows that about 98.9% of the variations in the dependent variable (bank loans) is explained by the variations in the independent variables all put together. Also, the f-statistics result shows that there is a considerable harmony that is associated with the regression result as this is statistically significant at 1%. The result further shows that there is likely no serial correlation of first order associated with the regression result as the coefficient is close to 2. For higher order serial correlation, the Breusch Godfrey serial correlation test is conducted and from Table 4, it can be revealed that there is no serial correlation of higher order as chi-square statistics fails to reject the null hypothesis of higher order correlation. The Jarque-Berra statistics test for the null hypothesis of the estimated trend been normally distributed as against the alternative hypothesis of not normal distribution. From the result, it can be revealed that the Jarque-

Berra statistics is not normally distributed as the probability value suggests that we reject the null hypothesis of normal distribution.

CONCLUSION AND POLICY RECOMMENDATION

This study examined the possibility of macro-prudential policies in reducing the cyclicality encountered between capital and bank loans both during the banking crisis and without crisis. It has been rightly established in the literature that periods of low capital structure for banks follows a decline in bank loans and is more severed during the banking crisis. However, the monetary and the banking regulatory authority implement macro-prudential policies which will reduce this cyclicality. The case for Nigeria has been examined and the study finds that macro-prudential policies help in reducing the procyclicality between bank loans and the extent of capital available for banks. The reduction in procyclicality has however been found to be less effective during the crisis than when the financial industry is not in crisis.

Further to the aforementioned findings, the study discovered that in the short run, capital and bank loans are countercyclical in nature and however this is reversed in the long run. The policy implication of this is that efforts made by banks to buffer the shortage in the capital by increasing lending cannot be sustained in the long run and thus, regulatory authority's macro-prudential policies are effective in reducing the procyclicality between banks loans and capital adequacy of banks. Furthermore, exchange rate depreciation stimulates increases in bank loans in the short run, however, domestic investment increases do not increase the tendency for bank loans to increase. Also, further policy implication that can be drawn from this study is that short term crisis does not deter banks from issuing out loans, however, in the long run, loans are greatly affected by the crisis within the system. It is also recommended that a quarterly appraisal of deposit money banks' loan structure be carried out by the monetary authority in order

to ensure that loans issued out does not fall below the loans to deposit ratios; also, default DMBs should be adequately sanctioned.

Our finding reveals that macro-prudential policies are able to ameliorate the impact which capital will have on lending, however, this is reduced during the period of crisis. There is a need for policymakers and the regulatory authority to focus attention on areas which the macro-prudential policies will have a greater impact in reducing the procyclicality and also, the regulatory authority must strengthen their measures especially during the period of crisis.

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