

Emerging Issues in **MANAGEMENT SCIENCES:**

PERSPECTIVES FROM NIGERIA

A Festschrift in honour of
PROFESSOR SIDIKAT LARABA ADEYEMI



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BANK SPECIFIC CHARACTERISTICS, MACROECONOMIC FACTORS AND FINANCIAL STABILITY IN NIGERIAN COMMERCIAL BANKS

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PREAMBLE

Given the importance of banking sector stability in maintaining a crisis free economy, bank management and monetary authorities are always concerned about factors that trigger instability in the sector. It is on this premise that this study investigates the determinants of banking sector stability in 10 Nigerian commercial banks over the period 2006 – 2017. The study analysed annual bank specific and macroeconomic data using the pooled ordinary least square regression method. Results showed that capital adequacy (0.256, $p < 0.01$), profitability (0.021, $p < 0.01$), liquidity (0.082, $p < 0.05$) and inflation (0.050, $p < 0.1$) as observed in the signs and significance of coefficients are important factors that affect bank stability in Nigerian commercial banks. The study recommends that bank management should endeavour to maintain adequate capital ratios as stipulated by monetary authorities and make sustainable profits. In addition, they should strike a balance between increased levels of liquidity and profits to prevent instability in the sector. Furthermore, monetary authorities are advised to maintain an inflation rate that would enable banks anticipate inflation so that they can factor its cost into their pricing.

INTRODUCTION

The banking sector as a subset of the financial sector, is a key component in the growth and development of any economy. Consequently, maintaining the stability of the sector is important to prevent crisis that may affect the overall economy. Ozili (2018) argues that in theory, bank regulators in developed economies mainly rely on capital adequacy for bank stability. However, Barth, Caprio and Levine (2004) and Brunnermeier (2009) show that in developing economies such as Nigeria, other factors may be responsible due to structural differences in their financial system. For instance, the 2007 / 2008 global financial crisis showed that banks are prone to crisis due to systemic dependence among banks. Such interdependence may have negative effects on bank stability (Brunnermeier, 2009; Oduor, Ngoka, & Odongo, 2017). This view became more pronounced post-2007/2008 financial crisis when series of structural shifts occurred in financial systems worldwide. Prominent names in the international financial domain such as Merrill Lynch, Lehman Brothers, Freddie Mac, Fannie Mae and a host of others were reported to have either gone bankrupt, recorded huge losses or were taken over by other firms. This resulted in a high degree of systemic risk in the industry with a contagion effect on the global financial system and thus a lot of instability in the sector (Diaconu & Oanea, 2014).

In the Nigerian banking sphere, an example of the preceding narrative was the insolvency of eight Nigerian banks in 2009 despite the fact that they increased their

Extant literature also provide support for the role played by bank capital in maintaining a sound and stable financial system. One of such is the bank capital buffer theory where banks maintain enough capital to act as a cushion to shield unforeseen risks that may destabilise its operations (Milne, 2002). The theory place emphasis on the excess capital that a bank has over the minimum required regulatory amount with the suggestion that the excess is used in stabilising banks during period of crisis (Oduor et al., 2017). In addition, contagious bank failures may occur when banks are unable to absorb losses that exceed the regulatory capital buffer (Ahmad, Ariff, & Skully, 2008). This suggests the existence of other factors aside capital adequacy that are likely determinants of bank stability. Summarily, the theory postulates that endogenous factors such as increases in bank characteristics (like liquidity, size, efficiency, capital and profit) would enhance financial stability in the banking sector. A stable and low level of inflation together with a booming economy would also augur well in achieving financial stability.

Empirically, quite a few studies have examined the determinants of bank stability. In terms of liquidity, two of such are Hassan, Khan, and Paltrinieri (2019) and Wagner (2007). On one hand, Hassan et al. (2019) examined the effect of liquidity and credit risk on stability of Islamic and conventional banks operating in selected Organization of Islamic Cooperation Countries for the period 2007 -2015 using a simultaneous structural equation approach. The study found a positive relationship between liquidity and stability for conventional banks and the reverse for Islamic banks. Wagner (2007) on the other hand, established the existence of a non-linear relationship between liquidity and bank stability such that liquidity has an inverse effect on bank stability. The study argued that initial improved bank stability due to higher liquid assets make banks to take on riskier projects to increase profits. The increased risk embarked upon by the bank subsequently erodes the initial positive effect and causes bank instability. This same view is expressed by Almarzoqi, Naceur, and Scopelliti (2015); Beck, De Jonghe, and Schepens (2013) and Čihák and Hesse (2010). Credit risk as a determinant of bank stability, accentuates the effect of liquidity on stability. This is because if the bank grants too much loan to distressed projects, it would be more difficult to recover such loans should they go bad making it hard to meet depositors demand for their deposits (Imbierowicz & Rauch, 2014). Thus, higher credit risks would destabilise the banking system.

Capital adequacy in extant literature promotes a sound and stable financial system. For instance, Van Roy (2008) found that stringent capital requirements in the G10 countries in the 1990s enhanced financial stability in the countries. Similarly, Furlong and Keeley (1989) and Keely (1990) present arguments that bank instability is reduced when incentives to take additional risks by a value maximising bank are cut down by higher capital requirements. Other studies with similar views are De Jonghe and Öztekin (2015); Miles, Yang, and Marcheggiano (2012) and Martinez-Miera and Suarez (2012). Contrastingly, Hakenes and Schnabel (2010) present an alternate argument by averring that monitoring incentives are lowered by additional capital requirements which in turn lowers quality of banks' portfolios and increase the risk of instability.

The advantages derived from economies of scales in banking operations come in to play when size is involved. Large-sized banks are argued to be more stable than small-sized banks due to economies of scale employed in operations by large banks (Berger & Bouwman, 2013). Moreover, as argued by Ozili (2018), a robust systemic regulatory system tends to make large-sized banks more stable than small-sized ones. Profitability is key to the operations of commercial banks and therefore play an important role in determining bank stability. More profitable banks appear more stable than less profitable ones (Dwumfour, 2017; Ozili, 2018). Conversely and relying on the risk-return hypothesis, Tan and Anchor (2016) argued that increased profitability leads to bank instability in China because the banks engage in more risky projects to earn more profits. This action consequently increases the level of instability in the banking sector.

Ozili (2018) and Dwumfour (2017) are two country level studies that relates to the present study. On one hand, Ozili (2018) investigated banking stability determinants in 48 African countries and found that efficiency, foreign ownership, concentration, size, institutional quality and unemployment are significant in explaining bank stability. Dwumfour (2017), on the other hand, found that net interest margin, ownership structure, concentration, size and regulatory environment are the significant determinants of bank stability in 32 Sub-Saharan African countries. Nonetheless, these two studies are based on country level data that did not account for firm-level determinants unlike when individual firm data is used. The use of country level data may give incorrect inference about individual firms (Holderness, 2016).

An exception to the bank stability literature in the Nigerian context as noted in the introductory section is Adekunle and Asaolu (2013) who investigated the effect of financial reporting practices on bank stability. The study found that even though banks in Nigeria complied with information disclosure requirements, the compliance level did not prevent banks' exposure to internal weakness and consequent distress. However, rather than use an appropriate measure for stability, Adekunle and Asaolu (2013) used performance measures such as return on assets and liquidity that do not adequately capture bank stability as shown in extant literature. The present study improves on this by using the Z-Score which is an insolvency measure usually used in determining the level of financial stability to proxy stability. Another recent and closely related work is Ozili (2019) who used aggregated data to investigate the determinants of bank stability in Nigeria using the ordinary least squares regression technique. Variables found to be significant determinants in Nigeria were bank efficiency, non-performing loans, regulatory capital, financial depth and bank concentration. However, the use of aggregate data does not capture bank specific peculiarities like individual bank characteristics would (Holderness, 2016) and may lead to incorrect inferences. Thus, we improve on Ozili (2019) by using individual bank level data and a panel regression technique that addresses the heterogeneity of banks in Nigeria.

From the empirical review, the present study contributes to existing literature on financial stability in Nigeria by investigating the determinants of financial stability using the Z-Score to proxy bank stability and panel data obtained from individual firms

rather than aggregate macrolevel data. Results obtained provide inferences that are unbiased and consistent with individual firm level characteristics.

METHODOLOGY

Data

In investigating determinants of bank stability in Nigeria, annual bank-specific data were obtained for 10 commercial banks whose data are available in Bankscope². Macroeconomic data are obtained from World Development Indicator database of the World Bank. The study period is between 2006 and 2017 and is also guided by data availability. Panel data which encompasses pooling of cross-sectional data over time is employed in the study. This has the advantage of addressing broader problems of heterogeneity of data and omitted variable bias in the analysis (Brooks, 2008). In addition, it holds more information, is more consistent and more efficient than cross-sectional data. With more information, one can get more reliable estimates with less restrictive assumptions. The final data set consists of 83 observations from an unbalanced panel taken from the 10 sample banks. The panel is unbalanced because some banks had missing observations in some years. However, this does not pose a problem because coefficient estimates would still be consistent and unbiased given that the nature of data is panel (Baltagi & Song, 2006).

VARIABLE SELECTION AND MEASUREMENT

Dependent Variable (Bank Stability)

Bank stability is proxied with Z-Score, a commonly used measure for financial stability and has the advantage of being easy to compute (Čihák & Hesse, 2007; 2010). Furthermore, it relates to how bank capital varies with its return in order to determine if the bank has enough buffer against unforeseen risks without the bank going into insolvency (Diaconu & Oanea, 2014). Higher values of Z-Scores indicate low risk and greater stability while lower values indicate otherwise (Lepetit & Strobel, 2013; Liu & Wilson, 2013). Z-Score is calculated as $\frac{(ROA + (Equity + Total\ assets))}{\sigma ROA}$ (%)

Bank-Specific Variables

Capital adequacy ratio as specified by regulatory authorities, indicates the amount of capital a bank has to absorb any unexpected / unforeseen losses that may arise from its day to day operations. This implies that banks that are involved in high-risk operations should maintain capital ratios in excess of regulatory requirements that would cushion

² As at May 2018, there were 21 commercial banks operating in Nigeria. The banks selected for the study include Zenith, GT, United Bank for Africa, Access, Diamond, Skye, Union, Fidelity, Unity and Wema. The selection was based on data that was available on Bankscope database as at the time of the study.

the effect of unforeseen losses. This action tends to improve bank safety and stability (Aiyar, Calomiris, & Wieladek, 2015; Shijaku, 2016). Accordingly, a positive relationship between capital adequacy and bank stability is expected. Capital adequacy measures a bank's capital to its risk and it is calculated as the ratio of total capital to total assets where total assets refer to risk weighted assets.

The level of credit risk a bank takes on can also affect bank stability. For instance, a situation where a bank has a high level of non-performing loans in its books and does not make adequate allowance for loan loss provisions may result in bank insolvency and destabilise the system (Hassan et al., 2019). This suggests an inverse relationship between credit risk and bank stability. Credit risk is measured as the ratio of loan loss reserves to gross loans (%).

In terms of profitability, more profitable banks are more stable than less profitable ones (Dwumfour, 2017). However, studies have also shown that higher profitability can also lead to higher bank fragility (Tan, 2017; Tan & Anchor, 2016). Thus, the relationship between profitability and stability is not clear. Profitability is measured as the return on assets and calculated as the ratio of a bank's net income to average assets (%). Return on assets shows how efficiently bank management has utilised bank assets to generate profit.

Efficiency measured as cost to income ratio reflects efficiency in bank operations. Existing literature shows that lower cost to income ratio results in improved profitability which in turn leads to a more stable banking system (Athanasoglou, Brissimis, & Delis, 2008; Olson & Zoubi, 2011).

Extant studies show that liquidity in the long run, impacts negatively on bank stability (Almarzoqi et al., 2015; Beck et al., 2013; Čihák & Hesse, 2010; Hassan et al., 2019). These studies argue that the initial linear effect is positive with higher liquidity levels improving bank stability and therefore more profits. However, increased profits result in more risky behaviour which reverses the earlier positive effect and leads to a negative effect. Liquidity is measured as the ratio of liquid assets to total assets (%).

With regards to bank size, studies argue that large banks are more stable than small banks due to economies of scale employed in operations by the large banks (Berger & Bouwman, 2013; Ozili, 2018). Thus, a positive relationship is expected between bank size and bank stability. Bank size is measured as the natural logarithm of bank total assets.

Macroeconomic Variables

The study account for macroeconomic conditions that may affect bank stability by including gross domestic product (GDP) and inflation in the regression equation. Good economic performance positively influences bank stability because loan defaults are fewer during periods and therefore, lower credit risks and more stable systems

(Demirgüç-Kunt & Detragiache, 2002; Laeven & Majnoni, 2003). Accordingly, a positive effect of GDP on bank stability is expected. Banks charge higher prices for financial services during periods of inflation which improves profit and creates a stable banking system (Jokipii & Monnin, 2013). They do this by anticipating inflation and factor its cost into the pricing process (Dwumfour, 2017). Thus, a positive effect of inflation on bank profit is also expected. GDP is calculated as the year on year growth rate of real GDP (%) while inflation is measured as the annual price consumer index (%).

Table 1: Variable Description, Measurement and Source

Variable	Measurement	Data Source	Supporting Literature
<u>Dependent Variable</u>			
Bank Stability (Z-Score)	This is proxied with Z-score and is calculated as $\frac{ROA + (Equity \div Total\ assets)}{\sigma_{ROA}}$ (%) This captures the default probability of the bank and compares the buffer of a bank (capitalisation and profit) against the volatility of the profit.	Bankscope	Lepetit and Strobel (2013); Liu and Wilson (2013)
<u>Bank-Specific Variables</u>			
Capital Adequacy	This is measured as the ratio of total capital (Tier1 and Tier2) to total assets where total assets refer to risk weighted assets and is expressed in %.	Bankscope	Aiyar et al. (2015); Shijaku (2016)
Credit Risk	Credit risk is measured as the ratio of loan loss reserves to gross loans (%)	Bankscope	Hassan et al. (2019)
Profitability	This is measured as the return on assets and calculated as the ratio of a bank's net income to average assets (%)	Bankscope	Tan (2017) Tan and Anchor (2016)
Efficiency	This represents the operational efficiency of the bank and is calculated as the ratio of costs to income (%)	Bankscope	Olson and Zoubi (2011)
Liquidity	The refers to the bank's liquidity position is measured as the ratio of liquid assets to total assets (%)	Bankscope	Almarzoqi et al. (2015) Hassan et al. (2019)
Bank Size	Bank size is measured as the natural logarithm of bank total assets.	Bankscope	Berger and Bouwman (2013)
<u>Macroeconomic Variables</u>			
Gross Domestic Product	This is measured as the year on year growth rate of real GDP (%)	World Bank Development Indicator Database	Laeven and Majnoni (2003)
Inflation	Inflation is measured as the annual price consumer index (%)	World Bank Development Indicator Database	Dwumfour (2017)

Source: Authors compilation based on literature

Model Specification and Method of Estimation

This study utilises a linear regression model to investigate the determinants of bank stability in Nigerian commercial banks and adapts model expressed by Dwumfour (2017) and Ozili (2018) as stated in Eq. (1)

$$BS_{it} = \alpha + \beta X_{it} + \varphi Y_{it} + \varepsilon_{it} \dots\dots\dots (1)$$

The conditioning variables, X , represent a set of bank specific variables and Y represent a set of macroeconomic variables. The set of bank specific variables and macroeconomic variables are defined in Table 1. BS is the measure of bank stability proxied with the Z-Score while i and t stands for bank and time respectively. ε_{it} is the error component in the model. β and φ are coefficients to be estimated. To determine the most appropriate method to estimate Eq. (1), a Breusch-Pagan – Lagrange Multiplier (BP-LM) test for heteroscedasticity with the null hypothesis of homoskedasticity of errors in regression is conducted. This determines whether to use pooled ordinary least squares (POLS) or generalised least square (GLS) regression estimation.

EMPIRICAL EVIDENCE

Descriptive Statistics

Table 2 presents the descriptive statistics of the variable in Eq. (1). The mean for bank stability is observed to be 9.5% with a standard deviation of 3.6%. This implies the relative stability of the banking sector over the period of study. The minimum value is observed to be negative and could be as a result of losses reported by the banks during the period under study. This inference is supported with the minimum of -3.1% for profitability. Nonetheless, the average value of bank stability implies a relatively stable system.

Table 2: Descriptive Statistics

Variable	Mean (%)	Std. Dev (%)	Min (%)	Max (%)
Bank Stability (Z-Score)	9.519	3.630	-0.941	18.086
Capital Adequacy	15.030	5.280	0.520	29.670
Credit Risk	5.572	6.340	0.190	43.640
Profitability	1.860	1.743	-3.110	6.140
Cost Efficiency	64.220	17.320	33.040	135.940
Liquidity	24.714	17.747	5.090	132
Size	11.860	3.633	6.170	16.910
GDP	3.884	2.850	-1.617	8.211
Inflation	11.513	3.167	5.382	16.50

Source: Author's computation from data of variables described in Table 1

In terms of efficiency, the banks in the sample are seen to be relatively cost efficient with an average score of 64% although the minimum is 33%. The minimum value may also be attributable to periods of low bank profits with an increase in operating costs. Capital adequacy has a mean of 15.03% well above the Basel III minimum requirement

of 8% implying that most of the banks are adequately capitalised. An exception to this is the minimum value of 0.52% recorded by one of the banks in a particular year which was corrected in subsequent years with no bank reporting a negative value. Average inflation value is observed to be in double digits (11.51%) and above the ideal rate of 2%. This implies that monetary policy regulators need to put in more efforts at lowering the inflation rate. Gross domestic product on the other hand is lower at 3.89% indicating the need for policy makers to make policies targeted at improving the economy. Nonetheless, there has to be a balance between these two macroeconomic variables because studies show that increases in GDP is usually associated with increases in inflation rate (Gokal & Hanif, 2004; López-Villavicencio & Mignon, 2011).

Table 3 reports result of the pairwise correlation analysis to determine the direction and strength of bivariate relationship between independent variables and if a problem of multicollinearity exists. Results shown in the table indicate low values of correlation below 0.7, suggesting the non-existence of multicollinearity issues (Malhotra & Birks, 2007). Capital adequacy is seen to have a value of 0.9 with bank stability but that is not a problem because they are on different sides of Eq. (1).

Table 3: Correlation Matrix

Variables	Bank Stability	Capital Ratio	Credit Risk	Profit	Cost Efficiency	Liquidity Risk	Size	GDP	Inflation
Bank Stability	1.000								
Capital Adequacy	0.963***	1.000							
Credit Risk	-0.171	-0.088	1.000						
Profitability	0.631***	0.403***	-0.316***	1.000					
Cost Efficiency	-0.602***	-0.473***	0.359***	-0.695***	1.000				
Liquidity	0.263**	0.244**	-0.226**	0.208*	-0.242**	1.000			
Size	0.050	-0.111	-0.168	0.026	-0.198*	-0.366***	1.000		
GDP	0.075	0.051	-0.017	0.070	0.048	0.306**	-0.508***	1.000	
Inflation	0.023	0.105	0.105	-0.003	-0.063	-0.166	0.128	-0.654***	1.000

Source: Author's computation from data of variables described in Table 1. ***, ** and * refers to 1%, 5% and 10% levels of significance respectively.

Table 4: BP-LM Test Result

χ^2	p-value	Hypothesis
0.15	0.6987	Do not reject
Decision: Pooled OLS is most appropriate method to use for the analysis		

Results from the BP – LM test in Table 4 to determine the choice of either a pooled or generalised regression indicates a pooled regression is appropriate through the non-significance of the Breusch–Pagan test statistics ($p > 0.05$). Accordingly, Table 5 reports results from the pooled ordinary least squares (POLS) regression estimation presented in Eq. (1).

Table 5: Pooled OLS Regression Estimates

Capital Adequacy	0.256*** (0.079)
Credit Risk	0.018 (0.021)
Profitability	0.021*** (0.008)
Cost Efficiency	0.026 (0.034)
Liquidity	0.082** (0.037)
Size	0.003 (0.060)
GDP	0.006 (0.013)
Inflation	0.050* (0.031)
Constant	-0.061** (0.025)
Adjusted R ²	0.8854
Ramsey Reset	2.62
F-statistics	3.03***
Banks Included	10
Observations	83

Source: Author's Computation

Table 5 presents the results of pooled OLS regression between bank stability, bank-specific and macroeconomic variables for the period 2006 – 2017 as specified in Eq. (1). The variables are as defined in Table 1. Robust standard errors are reported in parentheses. *, ** and *** denote significance at 10%, 5% and 1% levels respectively. Dependent variable is bank stability proxied by z-score.

The Ramsey reset test for functional form misspecification with the null hypothesis of coefficient equal to zero cannot be rejected ($p > 0.05$). This implies that the model does not suffer from omitted variables bias and is correctly specified. Furthermore, the significance of the F-statistics indicate that the independent variables are jointly significant in explaining the dependent variable, bank stability ($p < 0.05$). R^2 values also show that the 88.54% of the independent variables are responsible for variations in the bank stability.

Table 4 shows that three of the six bank-specific variables are significant in determining banks stability in Nigeria. These variables are capital adequacy, profitability and liquidity. Capital adequacy is seen to have a positive and significant effect on bank stability at 1% level of significance (0.256, $p < 0.01$). This suggests that an adequate capital as prescribed by regulatory authorities strengthens the banking system and ensures bank stability, consistent with the studies of Aiyar et al. (2015) and Shijaku (2016). Profitability is another variable that has a positive and significant effect on bank

stability at 1% level of significance (0.021, $p < 0.01$). This implies that sustainable profit made by Nigerian commercial banks promote bank stability as asserted by Dwumfour (2017) and does not lead to bank fragility. As more profit is made, relevant stakeholders have more confidence in the sector thus ensuing stability in the system. In terms of liquidity, only the linear effect of a positive relationship with bank stability is observed through the positive and significant coefficient of the liquidity variable (0.082, $p < 0.1$) although at 10% level of significance. This suggests that the banks in this study hold enough liquid assets to prevent bank runs which can result to insolvency in line with the study of Hassan et al. (2019). This finding is buttressed with a low incidence of bank run in the Nigerian banking sector after the 2005 consolidation exercise, especially when regulatory authorities maintain a high level of monitoring to ensure liquidity in the system. Of the two macroeconomic variables, only inflation is marginally significant at 10% level of significance 0.050, $p < 0.1$) supporting the assertion of Jokipii and Monnin (2013) and Dwumfour (2017) that banks charge higher prices for financial services during periods of inflation which in turn improves profit and creates a stable banking system. Nonetheless, the weak significance of the macroeconomic variables may be attributed to the weak transmission channels of monetary policy in Nigeria through which macroeconomic conditions are passed to banks. The Nigerian financial system has a large informal financial sector which has the tendency to create incomplete markets that makes monetary policy transmission uncertain and weak. Monetary policy as a result, becomes ineffective and does not meet the anticipated objective (Adegoke, 2014).

The findings in the preceding paragraph support the framework of financial stability theory of the existence of imbalances which may be endogenous or exogenous to the banking sector. The endogenous factors found to cause imbalances in this study are capital adequacy, profitability and liquidity while the exogenous one is inflation. These identified factors had positive effect on stability in the sector for the period of the study. It thus becomes important for commercial banks in Nigeria to limit and deal with the appearance of these factors before it constitutes a risk that may result in instability. The study also finds support for the capital buffer theory of banks holding excess capital to ward off unforeseen risks that can destabilise the system.

CONCLUSION

Given the importance of maintaining banking sector stability in any economy, this study investigates factors that determine bank stability in 10 Nigerian commercial banks over the period 2006 – 2017. Employing the pooled OLS regression estimation, results from the study indicate that capital adequacy, profitability and liquidity are significant bank-specific determinants while inflation is an important macroeconomic determinant of bank stability over the period covered. The study therefore recommends that bank management should have adequate capital ratios as required by regulatory authorities in addition to maintaining sustainable profits in order to have a stable banking sector. Concerning liquidity, bank management should ensure that they strike a balance between increased levels of liquidity and profit to prevent a situation whereby banks in

the bid to increase profit, would engage in more risky projects that would erode the positive effect of liquidity on stability. At the macro level, monetary policy authorities should ensure that inflation is kept at a rate that promotes bank stability such that banks are able to forestall inflation and factor it into their pricing process. Future studies may pay attention to and investigate the effect of monetary transmission channels (through which monetary policy objectives are transmitted to banks) on bank stability given that the present study finds a weak link between macroeconomic variables and bank stability. Noting that only commercial banks are used as samples in this study, caution should be made in generalising the results to non-commercial banks due to regulatory differences that exist between them.

REFERENCES

- Adegoke, I. A. (2014). *The Informal Financial Markets in Nigeria, Understanding Monetary Policy Series No 43*. Retrieved from <https://www.cbn.gov.ng/documents/MPseries.asp?beginrec=21&endrec=40>
- Adekunle, A. A., & Asaolu, T. (2013). An empirical investigation of the financial reporting practices and banks' stability in Nigeria. *Kuwait Chapter of Arabian Journal of Business and Management Review*, 33(854), 1-24.
- Ahmad, R., Ariff, M., & Skully, M. J. (2008). The determinants of bank capital ratios in a developing economy. *Asia-Pacific Financial Markets*, 15(3-4), 255-272.
- Aiyar, S., Calomiris, C. W., & Wieladek, T. (2015). Bank capital regulation: Theory, empirics, and policy. *IMF Economic Review*, 63(4), 955-983.
- Almarzoqi, R., Naceur, M. S. B., & Scopelliti, A. (2015). *How does bank competition affect solvency, liquidity and credit risk? Evidence from the MENA countries*: International Monetary Fund. Working Paper No. 15/210
- Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money*, 18(2), 121-136.
- Baltagi, B. H., & Song, S. H. (2006). Unbalanced panel data: A survey. *Statistical Papers*, 47(4), 493-523.
- Barth, J., Caprio, G., & Levine, R. (2004). Bank regulation and supervision: what works best? *Journal of Financial Intermediation*, 13(2), 205-248.
- Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: Cross-country heterogeneity. *Journal of Financial Intermediation*, 22(2), 218-244.
- Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146-176.
- Brooks, C. (2008). *Introductory Econometrics for Finance*. Cambridge University Press.
- Brunnermeier, M. K. (2009). Deciphering the liquidity and credit crunch 2007-2008. *Journal of Economic Perspectives*, 23(1), 77-100.
- Burgis, T. (2009). Nigeria takes control of five banks. *Financial Times Newspaper* report of 14th August 2009. Retrieved from <https://www.ft.com/content/0b233cf4-8905-11de-b50f-00144feabdc0>

- Čihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, 38(2-3), 95-113.
- Čihák, M. M., & Hesse, H. (2007). *Cooperative banks and financial stability*: International Monetary Fund. Working Paper No. 07/2
- De Jonghe, O., & Öztekin, Ö. (2015). Bank capital management: International evidence. *Journal of Financial Intermediation*, 24(2), 154-177.
- Demirgüç-Kunt, A., & Detragiache, E. (2002). Does deposit insurance increase banking system stability? An empirical investigation. *Journal of Monetary Economics*, 49(7), 1373-1406.
- Demirguc-Kunt, A., Detragiache, E., & Merrouche, O. (2013). Bank capital: Lessons from the financial crisis. *Journal of Money, Credit and Banking*, 45(6), 1147-1164.
- Diaconu, R.I., & Oanea, D.C. (2014). The Main Determinants of Bank's Stability. Evidence from Romanian Banking Sector. *Procedia Economics and Finance*, 16, 329-335.
- Dwumfour, R. A. (2017). Explaining banking stability in Sub-Saharan Africa. *Research in International Business and Finance*, 41, 260-279.
- Furlong, F. T., & Keeley, M. C. (1989). Capital regulation and bank risk-taking: A note. *Journal of Banking & Finance*, 13(6), 883-891.
- Gokal, V., & Hanif, S. (2004). *Relationship between inflation and economic growth*. Economics Department, Reserve Bank of Fiji. Working Paper 2004/04
- Hakenes, H., & Schnabel, I. (2010). Credit risk transfer and bank competition. *Journal of Financial Intermediation*, 19(3), 308-332.
- Hassan, M. K., Khan, A., & Paltrinieri, A. (2019). Liquidity risk, credit risk and stability in Islamic and conventional banks. *Research in International Business and Finance*, 48, 17-31.
- Holderness, C. G. (2016). Problems using aggregate data to infer individual behavior: Evidence from law, finance, and ownership concentration. *Critical Finance Review*, 5(1), 1-40.
- Imbierowicz, B., & Rauch, C. (2014). The relationship between liquidity risk and credit risk in banks. *Journal of Banking & Finance*, 40, 242-256.
- Jokipii, T., & Monnin, P. (2013). The impact of banking sector stability on the real economy. *Journal of International Money and Finance*, 32, 1-16.
- Keely, M. (1990). Deposit insurance, risk, and market power in banking. *American Economic Review*, 80, 1184 - 1200.
- Laeven, L., & Majnoni, G. (2003). Loan loss provisioning and economic slowdowns: too much, too late? *Journal of Financial Intermediation*, 12(2), 178-197.
- Lepetit, L., & Strobil, F. (2013). Bank insolvency risk and time-varying Z-score measures. *Journal of International Financial Markets, Institutions and Money*, 25, 73-87.
- Liu, H., & Wilson, J. O. (2013). Competition and risk in Japanese banking. *The European Journal of Finance*, 19(1), 1-18.
- López-Villavicencio, A., & Mignon, V. (2011). On the impact of inflation on output growth: Does the level of inflation matter? *Journal of Macroeconomics*, 33(3), 455-464.

- Malhotra, N., & Birks, D. (2007). *Marketing Research: an applied approach*: 3rd European Edition: Pearson education.
- Martinez-Miera, D., & Suarez, J. (2012). A macroeconomic model of endogenous systemic risk taking. *CEPR Discussion Paper* No 9134.
- Miles, D., Yang, J., & Marcheggiano, G. (2012). Optimal bank capital. *The Economic Journal*, 123(567), 1-37.
- Milne, A. (2002). Bank capital regulation as an incentive mechanism: Implications for portfolio choice. *Journal of Banking & Finance*, 26(1), 1-23.
- Oduor, J., Ngoka, K., & Odongo, M. (2017). Capital requirement, bank competition and stability in Africa. *Review of Development Finance*, 7(1), 45-51.
- Olson, D., & Zoubi, T. A. (2011). Efficiency and bank profitability in MENA countries. *Emerging markets review*, 12(2), 94-110.
- Ozili, P. K. (2018). Banking stability determinants in Africa. *International Journal of Managerial Finance*, 14(4), 462-483.
- Ozili, P. K. (2019). Determinants of Banking Stability in Nigeria. MPRA Paper No. 94092. Retrived from https://mpra.ub.uni-muenchen.de/94092/1/MPRA_paper_94092.pdf
- Sanusi, L. S. (2012). *Banking Reform and Its Impact on the Nigerian Economy*. Paper presented During Warwick's Economic Summit. University of Warwick, Warwick.
- Schinasi, G. J. (2009). Defining Financial Stability and a Framework for Safeguarding It. *Working Paper* 550, Central Bank of Chile.
- Segoviano, M.A., & Googhart, C.A.E. (2009). Banking Stability Measures. International Monetary Fund Discussion Paper 627.
- Shijaku, G. (2016). Banking Stability and its Determinants: A Sensitivity Analysis on Methodological Changes. *The Economic Review*, 18-30.
- Tan, A. Y., & Anchor, J. (2016). Stability and profitability in the Chinese banking industry: evidence from an auto-regressive-distributed linear specification. *Investment Management and Financial Innovations*, 13(4), 120-128.
- Tan, Y. (2017). The impacts of competition and shadow banking on profitability: Evidence from the Chinese banking industry. *The North American Journal of Economics and Finance*, 42, 89-106.
- Van Roy, P. (2008). Capital requirements and bank behavior in the early 1990s: Cross country evidence. *International Journal of Central Banking*, 4(3), 29-60.
- Wagner, W. (2007). The liquidity of bank assets and banking stability. *Journal of Banking & Finance*, 31(1), 121-139.