Macro-Prudential Determinants of Financial Stability in Nigeria

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Abstract

This study examined the macro-prudential factors that affected Nigerian banks' stability between 1990 and 2020. The key purpose was to examine the extent to which RGDP growth rate, Inflation Rate, Balance of Payment (% of Total Assets), capital adequacy ratio, liquidity ratio, and sensitivity to market risk have affected banks financial stability in Nigeria. The data for the study were obtained from the CBN Statistical Bulletin, Financial Stability Report, and Annual Reports of all DMBs in Nigeria. Since the unit root test confirmed that the study variables achieved stationary both at level and first difference, the data were subsequently analyzed using ARDL approach. The findings showed that both in the short and long run, the real gross domestic product growth rate had a statistically significant beneficial influence on financial stability. Only in the short run do the rates of inflation, capital sufficiency, and payment balances have a negative, significant impact on financial stability. At a 5 percent level, liquidity had a significant beneficial impact on financial stability, but sensitivity to market risk had a significant positive impact in the short run but a negative impact over the long run. The paper is original by extending previous studies to developing economies and incorporated a wide range of macro-prudential determinants proxies such as RGDP growth rate, Inflation Rate, Balance of Payment (% of Total Assets), capital adequacy ratio, liquidity ratio, and sensitivity to market risk against subsequent studies.

Keywords: Bank stability, capital adequacy, GDP, inflation, liquidity, Macro-prudential, Nigeria, banking performance

JEL Classification: N27

1. Introduction

Financial stability is important for the growth and development of the global financial system, which affects developed, developing, and underdeveloped countries and markets.Financial stability results in overall economic growth and higher living standards for a financial system.On the other hand, an unstable financial system breeds crises in financial intermediation, unimaginable suffering for the populace and a lack of faith in the financial system, all of which stymie economic expansion.Identification and assessment of the financial system's susceptibility to macroeconomic shocks have become hot topics of debate among academics and policymakers worldwide since the severe financial crises of the 1900s.

The costly market disruptions caused by the 2008 and 2009 global financial crises have given rise to fresh worries about the stability of the financial system.Therefore, the significance of regulators and other interested parties reviewing and evaluating the indicators for gauging the stability of the financial system cannot be emphasized (Koskei, 2020).The literature on finance has produced some macro-prudential indicators for recurrently evaluating the stability of the financial system.The International Monetary Fund (2021) separated the macro-prudential indicators into micro- and macro-prudential elements that affect financial stability.Some academics contend that while micro (bank-specific) issues might contribute to financial stability or instability, they are insufficient on their own to guarantee bank stability in emerging

economies.Among them are Ozili (2018), Lucky (2017), and Swamy (2014).The 1990s financial crisis, which ended in a bank run, can be connected to shocks in the macroeconomy and monetary policy.As a result, in order to ensure the financial stability of the banking sector, both the general macroeconomic and micro-prudential business environments that influence banking sector stability should be given careful consideration.

The Nigerian government has implemented numerous reforms and policies to safeguard the strength and financial stability of the banking sector and prevent bank failure, but the topic of bank stability has continued to spark debate and contention.This has sparked intense scholarly interest and created a large research deficit in the area of financial stability.According to scholars, local and macro problems exacerbated the global financial crisis.The macro-prudential factors that have been identified vary depending on subsequent studies and include the Real GDP (RGDP) growth rate, inflation rate, gross fixed capital formation (percent of total assets), public sector expenditure (percent of total assets of DMBs), government revenue (percent of total assets), unemployment rate, and balance of payment (percent of total assets) (percent of total assets).

Therefore, the objectives are to determine whether inflation has an impact on the financial system's stability and how the RGDP growth rate affects it,analyze the balance of payments (as a proportion of total assets) to see if it has an effect on the financial system's stability.In order to determine if the capital adequacy ratio significantly affects the stability of the financial system in Nigeria, it is important to also assess the impact of liquidity on the financial system's stability.

2. Literature Review

Financial stability can be defined as the financial system's capacity to mitigate economic imbalance brought on by shocks to the macro economy and monetary policy.Financial stability, according to the Central Bank of Korea (2020), is a state in which the infrastructure, markets, and financial institutions (FIs)—the three main parts of the financial system—are secure.If a financial institution is strong enough to fully fulfil its fiduciary duties without outside support, it is said to be stable.There are no significant changes in the market value of a financial asset in a stable financial market.A stable financial infrastructure is one in which the safety net, payment system, and settlement system are all operating effectively and the financial system fosters the smooth operation of market discipline (Central bank of Korea, 2021).Financial stability (FS) is described by the electronic library (2021) as the capacity of the financial system to support and advance the economic activity, manage risks, and take macroeconomic and monetary policy into account.A stable financial system, on the other hand, can efficiently allocate resources, access and manage financial risks, retain employment, and the like, according to World Bank (2021).

Macroeconomic indicators (credit growth, debt levels, capital flows, external debt, asset prices, economic growth, and real interest rates), Financial market indicators (bank share price, credit spreads, and profitability), and banking-specific indicators (capital adequacy, asset quality, provisioning exposure concentration, related party exposures, liquidity, sensitivity to market risks, and profitability) are all examples of macro-prudential determinants of financial stability(FS) Hawkesby (2017).The macro-prudential indicators of FS were more specifically divided by the IMF (2020) into aggregate micro-prudential indicators and macroeconomic

environment.The conceptual model for this study demonstrates a directional relationship between the dependent variable(financial stability) and the independent variable (macro-prudential determinants—aggregated micro- and macroeconomic determinants).Although a number of theories have been put forth to support research on macro-prudential factors affecting bank stability, the current study relies on the bank run theory, the buffer theory of capital adequacy, and the management discretion theory.

Diamond and Dybvig (1983), who first proposed the bank run theory, provided evidence that banks frequently undertake obligations today in order to produce high profits in the near future.As a result, they favour long-term loans over those with short-term gestation periods.These loans do not have much liquidity, nevertheless.On the other hand, savers can require cash because of unplanned expenses.Therefore, effective bank management procedures encourage banks to keep money in their safes just in case.This is because if they don't, they might not be able to call in their loans from the borrowing public, and even if they do, the public might not be able to pay them back as quickly as possible as their loans were supposed to be used to finance long-term investments.Therefore, if every depositor tries to withdraw their money at once, such a bank will become insolvent.

The implication of the aforementioned is that all banks could be at risk of a bank run (panics).This is due to the fact that banks shouldn't initially grant long-term loans to the borrowing public if a depositor anticipates that other depositors would withdraw their money from the bank.However, the only sensible course of action for a depositor is to hurry and withdraw their funds from such a bank before other depositors do the same.The viability of such a bank may come into doubt as a result of this action.Diamond-Dybvig believed that this hypothesis was a self-fulfilling prophesy as a result.It is important to note that Lucky(2017) and Ozili(2019) used this hypothesis as the foundation for their research.

According to Calem and Rob's (1996) buffer theory of capital adequacy, banks may be enticed to increase capital and lower risk as they get closer to the minimum regulatory capital ratio in order to avoid the significant regulatory costs that would result from a capital requirement violation.According to reports, the majority of Nigerian banks reportedly failed in 2005, and the CBN withdrew the licenses of a few others due to their high-risk exposure and inadequate capital bases, in accordance with Section 7 (2) of the Bank and Other Financial Institutions Act (Akani & Lucky, 2015).Ikpefan (2013) emphasized that the main reason why banks prefer to hold excess capital is to reduce the probability of experiencing low CAR, especially if their CAR is highly volatile, in order to further emphasize the role of the buffer theory of capital adequacy theory in maintaining financial stability.A bank that has enough capital, however, is able to absorb and endure both macroeconomic and monetary policy fluctuations.Section 13 of the BOFIA, which requires banks to constantly maintain a reasonable CAR level and that any or all of their accessible assets and liabilities (both within and outside of Nigeria) must meet CBN criteria, lends more support to this.Ozili (2020), Githinji (2016), Akani and Lucky (2015), who used this theory in their study, highlighted the need for management to take the theory into account while forming policies about financial stability.

In 1976, Jensen and Meckling popularized the managerial discretion hypothesis.This theory, which is an expansion of the agency theory, is also referred to as the management expense

hypothesis.According to the management discretion theory, there may occasionally be a conflict of interest between management and owners as a result of the separation of the two groups.As a result, improper handling could increase the bank's risk exposure, reduce its capital base, and endanger its capacity to maintain its financial stability.This idea served as the foundation for studies conducted by academics including Kasri and Azzahra (2020); Koskei (2020); Koteso (2019); and Lucky (2017).

The macro-prudential (micro-prudential and macroeconomic) drivers of FS have been the subject of a sizable body of existing studies.Kasri and Azzahra (2020) examined 94 Indonesian banks from 2015 to 2019, banks' stability drivers.According to their findings, the stability of Indonesian banks was positively impacted by the exchange rate, financial inclusion, asset returns, and credit/financing expansion.Interest rates, however, are discovered to have a detrimental impact on stability.Alihodzic, Ibrahim, and Dogan (2020) study looked at the factors that affect bank stability in Turkey and the Balkans.Total non-interest income, net interest margin, Lerner index, total income, ratio of foreign bank assets to total assets, GDP, and cost to income ratio are the determinants used to calculate the regressor.Bank stability, as assessed by the non-performing loan ratio and Z-Score, acted as the regressand.The study found a very statistically significant correlation between bank stability indicators, Lerner index, GDP, net interest margin, and cost to income ratio.However, the ratio of total bank assets to foreign bank assets and total income from non-interest sources had a little statistically significant impact on bank stability parameters.

The elements that influenced the stability of the Kenyan banking industry were evaluated by Koskei (2020).The study's multivariate regression analysis showed that the liquidity ratio, inflation rate, and loan rate had a negative (non-linear), significant impact on bank stability.Loan growth and return on equity were positively and statistically significantly impacted by bank stability.However, the results of exchange rates have a marginally favorable impact on bank stability.Particularly, data on return on assets and public debt revealed a negative but insignificant impact on bank stability.The study came to the conclusion that the government's initiatives are meant to address the growing microeconomic and macroeconomic issues impeding the stability of Kenyan banks.The mediating impact of macroeconomic factors on the financial soundness and financial performance of 39 commercial banks in Kenya was investigated by Kirimi, Kariuki, and Ocharo (2020).The study spans the years 2009 to 2018.The study discovered that the only well-known mediating variables that mediated between the two constructs were the GDP growth rate, exchange rate, interest rate, and inflation rate.On this note, the researcher suggested that bank management comprehend the macroeconomic dynamics of bank stability as soon as possible.

Latief, Ashraf, and Nawaz studied the variables that impacted Pakistan's financial stability between 2001 and 2011 in 2019.The regressor is financial stability operationalized by interest rate spread, bank size, return on equity, return on asset, liquidity ratio, net performing loan portfolio, and interbank fund ratio, whereas the regressed variable is bank stability as determined by the overall financial stability index.Strong statistical evidence was discovered in the study to substantiate the effect of all the target factors on bank stability.Alsamara and Barkat (2019) looked at how Qatar's economic growth is impacted by the country's financial stability

from the first quarter of 1980 through the fourth quarter of 2013.Real loan provision serves as the regressor for financial stability, while real GDP serves as the regressor for economic growth.The VECM methodology was used in the study.According to the study, sudden shocks to real GDP have a considerable detrimental long-term effect on financial stability.

The impact of financial development, financial stability, and economic growth in the European Union was explored by Sotiropoulou, Giakoumatos, and Petropoulos in 2019.The study included data from 28 EU member states.According to the panel data regression, factors that promote growth include market capitalization, trade openness, bank assets, private sector credits, and liquidity liabilities.Growth is restored by monetary stability (non-performing loans, notwithstanding).According to Shim (2019), the stability of commercial banks in America is primarily influenced by macroeconomic variables and bank-specific characteristics (loan diversification, non-interest share, bank size, brokered and core deposits) (GDP growth and unemployment).

3. Methodology

The analysis used secondary time series data from the World Bank (2020) data set, the CBN Statistical Bulletin, the Financial Stability Report, and the Annual Reports of all Deposit Money Banks (DMBs) in Nigeria.As of December 31, 2020, it covers the 14 DMBs listed on the Nigerian stock exchange (CBN, 2020).The period includes a number of government-formulated changes designed to ensure bank stability, including bank consolidation, financial sector deregulation, and bank privatization.The incorporation of aggregate micro-prudential proxies in this analysis differs from the works of Vo, Nguyen, Le, and Pham (2020), which it is modeled after but our model is described below.

$$\text{Z-score} = \beta_0 + \beta_1 RGDP + \beta_2 INFR + \beta_3 BOP + \beta_4 CAP + \beta_5 LIQ + \beta_6 SENS + ų_{it} \qquad (1)$$

Where Z-score is Aggregate Bank z-score; RGDP is Real Gross Domestic Product growth rate; INFR is Inflation Rate to proxy Consumer Price Index; BOP is Balance of Payment measured by Balance of Payment (% of Total Assets); CAP is Capital Adequacy ratio measured by regulatory Capital to Risk-Weighted Assets ratio; LIQ Liquidity proxy by aggregate bank liquidity ratio; SENS is sensitivity to market risk measured by the change in the exchange rate; β_0 is Constant Value; β_1-β_6 are Parameter Estimates. We used an estimation technique that encompasses the unit root test, Auto-regressive Distributed Lag (ARDL) Bound Co-integration test, and ARDL Co-integrating and Long-form.

4. Results

Data for the study was taken from the World Bank Data Bank as of 2020, the Financial Stability Report, the Annual Reports of all DMBs in Nigeria, and the CBN Statistical Bulletin.

Table 1: Summary of Descriptive Statistics

	ZSCORE	RGDP	INFR	BOP	CAP	LIQ	SENS
Mean	12.71207	10.45235	18.27774	45.82581	16.84806	47.79677	11.33677
Median	13.37200	11.36470	12.54000	50.77000	17.66000	46.23000	1.870000
Maximum	20.06930	13.28010	72.72000	99.17000	22.60000	81.42000	70.45000

Minimum	5.054230	-13.90000	4.560000	11.57000	1.800000	26.39000	-7.260000
Std. Dev.	4.895272	4.813046	16.92052	27.53239	4.816677	12.55578	20.60861
Observations	31	31	31	31	31	31	31

Source: Econometric Views Version 9.0 (2021)

Table 2 below shows the correlation analyses' findings.

The strength of association between the variables under consideration is made clear by the correlation analysis.

Table 2: Summary of Correlation Statistics

	ZSCORE	RGDP	INFR	BOP	CAP	LIQ	SENS
ZSCORE	1.000000						
RGDP	0.130590	1.000000					
INFR	-0.521476	-0.080006	1.000000				
BOP	-0.109133	0.120078	0.305001	1.000000			
CAP	-0.013445	-0.226488	-0.064275	0.066988	1.000000		
LIQ	0.280763	-0.164328	-0.144009	-0.226288	0.502765	1.000000	
SENS	0.255894	-0.278748	-0.199807	-0.210959	-0.117479	0.164465	1.000000

Source: Econometric Views Version 9.0 (2021)

The real gross domestic product growth rate, liquidity, and sensitivity to market risk are all directly (positively) correlated with the Z-score score, despite the low linkage between them, according to Table 2's correlation coefficient.This is because the correlation values at 0.130590, 0.280763, and 0.255894, respectively, are positively signed and less than 30%.However, the correlation between the Z-score and the inflation rate, balance of payments, and capital adequacy ratio is inverse.The correlation's negatively signed, negative values—-0.521476, -0.109133, and -0.013445—are to blame for this.Since only the inflation rate's coefficient value is higher than 30%, it also only showed a poor relationship with the bank stability proxy.The results also demonstrated that none of the independent characteristics significantly correlated with one another.This demonstrates the impossibility of the multi-co linearity problem.So that we could verify the claims made above, we ran a diagnostic test on the test (see the diagnostic test section).

In order to ensure that the model is correctly presented and to increase confidence in the findings, the unit root test is used to examine the time-series characteristics of the data.

The outcomes of the unit root test are displayed in Table 3 below:

Table 3: Summary of ADF Test ADF test statistic for Levels Parameter

ADF test at Levels				
Parameter	ADF test statistic	Test critical value @ 5%	Prob.*	Decision
Z-Score	-1.459814	-2.967767	0.5392	Non-stationary
RGDP	-1.322349	2.967767	0.6060	Non-stationary
INFR	-3.261910	-2.967767	0.0260	Stationary
BOP	-7.287444	-2.967767	0.0000	Stationary

CAP	-3.185670	-3.185670	0.0309	Stationary
LIQ	-2.783620	-2.963972	0.0072	Stationary
SENS	-3.830769	-2.963972	0.0068	Stationary
ADF test at Levels				
Parameter	ADF test statistic	Test critical value @ 5%	Prob.*	Decision
Z-Score	-8.154405	-2.967767	0.0000	Stationary
RGDP	-5.133256	-3.574244	0.0014	Stationary
INFR	-6.317541	-2.967767	0.0000	Stationary
BOP	-12.63267	-2.967767	0.0000	Stationary
CAP	-5.698178	-2.967767	0.0001	Stationary
LIQ	-6.590885	-2.967767	0.0000	Stationary
SENS	-5.456464	-2.967767	0.0001	Stationary

Source: Econometric Views Version 9.0 (2021)

Table 3 displays the series used for the inquiry in their stationary order of integration.With the exception of Z-score and RGDP growth rate, all series that underwent the ADF test were found to be stationary at levels.The Z-score and the real GDP growth rate did, however, achieve stationarity at the initial difference after additional testing.It can be inferred that all series attained stationarity at the level and first differencing as a result.In light of the fact that our series was demonstrated to be stationary at levels and first differencing, it was justified to examine the long-term relationship between bank stability and its macro-prudential determinants proxy.

The ARDL method was also used to determine whether the regressed and regressor had a long-run equilibrium relationship.The outcomes of the ARDL bounds cointegration test are shown in Table 4 below.

Table 4: ARDL Bounds Test

Date: 08/27/21 Time: 22:17		
Sample: 1991 2020		
Included observations: 30		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	7.963169	6
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.12	3.23
5%	2.45	3.61
2.5%	2.75	3.99
1%	3.15	4.43

Source: Econometric Views Version 9.0 (2021)

The calculated F-statistics values were 7.963169, which is higher than the upper bounds for the 10%, 5%, and 2.5% significance levels (2.12, 2.45, and 2.75) for all three levels of

significance.These findings suggest a long-term connection between bank stability and its proxy macro-prudential drivers.

The multicolinearity test, heteroskedasticity test, and normality test were performed to reinforce the conclusions even further.The tables listed below display the test results.

Table 5: Multi-collinearity Test

Sample: 1990 2020		
Date: 08/27/21 Time: 22:54		
Included observations: 30		
	Variance Inflation Rate	Tolerance Value
Variable	**VIF**	**TV**
ZSCORE	1.5416	0.6487
Real Gross Domestic Product growth rate(RGDP)	1.1873	0.8422
Inflation Rate (INFR)	1.5095	0.6625
Balance of Payment (BOP)	1.4315	0.6986
Capital Adequacy ratio (CAP)	1.8066	0.5535
Liquidity (LIQ)	1.9949	0.5013
Sensitivity to market risk (SENS)	1.2185	0.8207

Source: Econometric Views Version 9.0 (2021)

Table 6 reported that the VIF of the variables are within the acceptable range since their respective VIF values estimated 1.5416, 1.1873, 1.5095, 1.4315, 1.8066, 1.9949, and 1.2185are higher than 1 but less than 10.This implies zero multi-co linearity among regressors.Similarly, the Tolerance Values (TV) values fell within the accepted range of not less than 0.10.This reaffirmed that the model is free from multicollinearity problem.

Figure 1: Normality Test
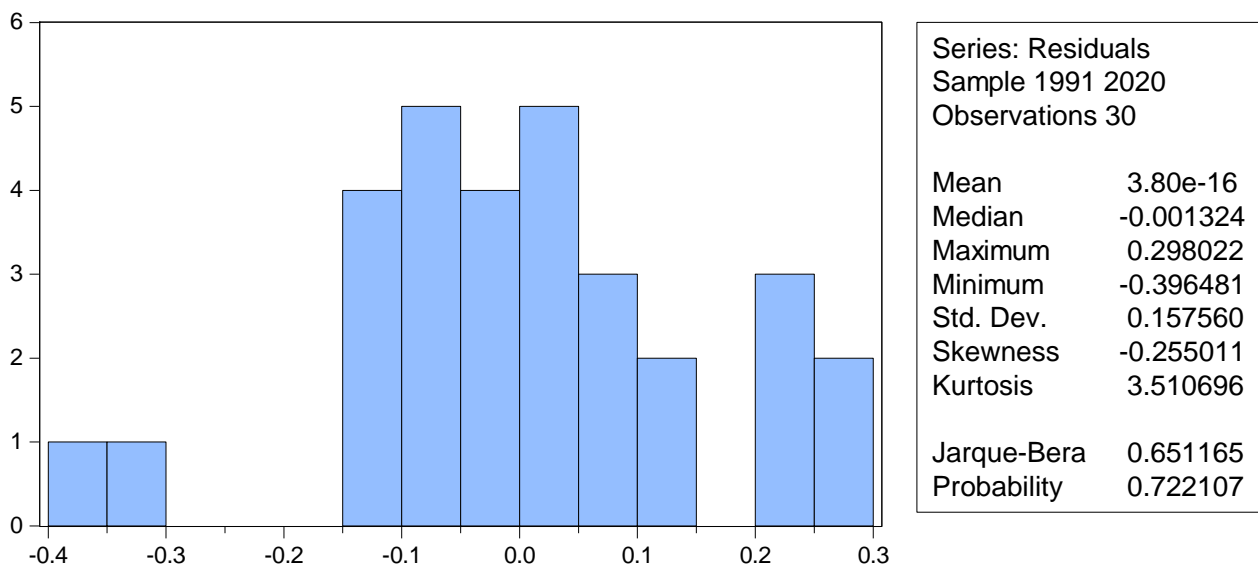
Source: Econometric Views Version 9.0 (2021)

The residual (error term) are Normally Distributed, according to the normality test.

This is due to the fact that the majority of their p-value residuals are higher than 5%.

This suggests that the model was successful in maintaining its Best Linear Unbiased Estimate (BLUE).

Table 7: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.565846	Prob. F(7,22)	0.7754
Obs*R-squared	4.577175	Prob. Chi-Square(7)	0.7114
Scaled explained SS	3.090043	Prob. Chi-Square(7)	0.8765

Source: Econometric Views Version 9.0 (2021)

Because the probability value of the chi-square was more than a 5% significance level, it may be inferred from table 7 that the null hypothesis of homoscedasticity was not rejected.

Therefore, the null hypothesis that the residuals have zero mean and no constant variance is rejected.

This suggests that the model's residual was homoscedastic.

In light of the aforementioned, the ARDL short-run and long-run outcomes are shown below:

Table 8: Long Run Form and ARDL Co-integrating

Dependent Variable: ZSCORE				
Selected Model: ARDL(1, 0, 0, 0, 0, 0, 0)				
Date: 08/27/21 Time: 22:45				
Sample: 1990 2020				
Included observations: 30				
Co integrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP)	0.015727	0.004794	3.280720	0.0073
DLOG(INFR)	0.087657	0.037169	2.358315	0.0379
DLOG(BOP)	-0.006736	0.040302	-0.167131	0.8703
DLOG(CAP)	-0.170404	0.055361	-3.078030	0.0105
DLOG(LIQ)	0.574655	0.096307	5.966926	0.0001
D(SENS)	0.002998	0.001063	2.820490	0.0167
CointEq(-1)	-0.205646	0.069587	-2.955237	0.0131
Cointeq = ZSCORE - (0.0765*RGDP + 0.0736*LOG(INFR) +				
0.1331* BOP -0.8160*CAP + 3.6859*LIQ -0.0211				
*SENS -10.4584)				
Long Run Coefficients				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
RGDP	0.076476	0.026308	2.906981	0.0143
D(INFR)	0.073637	0.204323	0.360397	0.7254
D(BOP)	0.133052	0.357001	0.372695	0.7165
D(CAP)	-0.816017	0.423438	-1.927121	0.0802

D(LIQ)	3.685887	0.822255	4.482655	0.0009
SENS	-0.021061	0.012659	-1.663670	0.1244
C	-10.458368	3.075377	-3.400678	0.0059
R-squared	0.986413		F-statistic	46.97699
Adjusted R-squared	0.965415		Prob(F-statistic)	0.000000
Durbin-Watson stat				1.915084

Source: Econometric Views Version 9.0 (2021)

It is discovered that the ARDL Co integrating result is both unfavorable and statistically significant.This shows that after short-run disequilibrium, the variables converge.According to the outcome, the current period has corrected 20.56% of the previous deviation.The adjusted R2 otherwise known as the adjusted coefficient of determination takes into consideration the extent to which total variation in the dependent is caused by both the independent variables and other factors which affect the independent variables captured by the error term having considered the loss of the degree of freedom (n-k).The adjusted R2 indicates that the independent variables (real gross domestic product growth rate, inflation rate, liquidity, balance of payments, and sensitivity to market risk) account for 98.64 percent of the variation in the dependent variable (z-score), while the error term accounts for the remaining 1.36 percent.Additionally, the likelihood of the F-Statistic indicates that the model fits the data fairly well.We reject the null hypothesis that all of the regression coefficients are zero because the p-value for the aforementioned regression is essentially zero.Although it doesn't state which independent variable is relevant, this data shows that at least one of them is.

5. Discussion

Real gross domestic product growth rate and Bank Stability(Z-Score)

Favorably sloping and statistically significant in both the short and long runs, the ARDL Co-integrating and Long Run Co-efficient of the real gross domestic product growth rate, represented by RGDP, is positively skewed.This is as a result of the coefficient's estimated values of 0.015727 and 0.076476.This implies that a 1% increase in RGDP will improve bank stability, even though the p-value is expected to be between 0.0073 and 0.0143, which is less than a 5% significant level.This implies that the rate of economic development and expansion affects the stability of the banking industry.Or, to put it another way, the financial sector's stability is based on the rate of economic growth.However, it supports the conclusions of Vo, Nguyen, Le, and Pham (2020); Kirimi, Kariuki, and Ocharo; and Githinji's (2016) findings (2020).

Bank stability and inflation rate(Z-Score)

The ARDL Co integrating and Long Run co-efficient of inflation rate (INFR) have both positive short-run and long-run slopes.This is as a result of the positive sign of the coefficient and the projected values of 0.087657 and 0.073637.This study lends credence to the idea that sustained inflation discourages saving and favors investment, which may result in a macroeconomic imbalance that threatens the stability of the financial system.In terms of its influence, the inflation rate only barely above the level of statistical significance.This implies that the rate of inflation only influences the stability of banks in the near run.This conclusion is similar with the

findings of Githinji (2016), Koskei (2020), Kirimi, Kariuki, and Ocharo (2020), although it differs from those of Ozili (2019).

Bank stability and adequate capital (Z-Score)

The ARDL Co-integrating and Long Run Co-efficient of Capital Adequacy, denoted as CAP, has a negative slope in both the short and long runs.Its expected coefficient values of -0.170404 and -0.816017 are both negatively signed, which is why this is the case.This contradicts the Apriori hypothesis, according to which enough capital and bank stability are positively connected.This result ran counter to the hypothesis that banks with appropriate capital should be more stable under pressure than banks with insufficient capital.The z-score (the dependent variable) may be the primary reason for the negative sign as the capital ratio is already taken into account when calculating the z-score.The first authors to back this assertion were Githinji (2016), Hawkesby (2017), and Ozili (2019).Capital adequacy barely passed the test of statistical significance in the short run, according to the data.This is due to the fact that its calculated p-value of 0.0105 was below a 5% level of significance.This suggests that a short-term policy response to volatility is capital adequacy.

Bank stability and the balance of payments (Z-Score)

The regression outcome in the table above demonstrated that the short-run slope of the balance of payments, or BOP, is negative (-0.006736).This supports the study's a priori hypothesis.However, it eventually turned out well in the end (0.133052).This finding suggests that a rise in the balance of payments will reduce bank stability by 0.6736 in the short term but increase it by 13.3052 in the long term.This further demonstrated that, in the short term, bank instability is less likely to occur with higher balances of payment, but that, over the long term, a higher balance of payment value indicates a high potential of bank instability.BOP was discovered to be statistically unimportant in the long run as well as the short term.This is due to the fact that its p-value, which is predicted to be between 0.0.8703 and 0.71652, is higher than the 5% significant level.This implies that the BOP is not a significant predictor of bank stability.This is consistent with Kirimi, Kariuki, and Ocharo's (2020) findings; Lucky (2017).

Bank stability and liquidity (Z-Score)

At a 5% level of significance, the ARDL Co-integrating and Long Run Co-efficient of Liquidity, or LIQ, is positively sloping and statistically significant.This is because its p-value, estimated at 0.0379 and 0.0009, is less than a 5% significant level and its coefficient values, 0.087657 and 0.073637, are both positively signed.This shows that one of the key factors affecting bank stability is liquidity.This further demonstrated the need for sound liquidity management in order to maintain the stability of the banking sector.The findings of Aigul, Xin, and Omaima (2020); Latief, Ashraf, and Nawaz (2019); Lucky (2017); and Hawkesby are in agreement with this outcome.

Bank stability and market sensitivity (Z-Score)

SENS, which stands for the ARDL Co-integrating and Long Run Co-efficient of Sensitivity to Market Risk, initially has a positive impact on bank stability measures but turns negative with time.This suggests that a SENS increase will short-term expose the Nigerian banking sector to instability by 0.002998.However, over time, a SENS rise will result with a -0.205646 reduction in

the likelihood of bank instability.Sensitivity to market risk only successfully passed the test of statistical significance in the short.This suggests that liquidity contributes to bank stability only temporarily.The outcome could be attributed to lax compliance on the part of the bank management and overly stringent liquidity regulations from the regulatory body, such as the removal of all public funds from the banking sector in 1997 and 2015 with the so-called "Treasury Single Account" 140 (TSA), which put the liquidity position of the commercial banks at risk.This might also be due to the time-dependent nature of bank liquidity.This outcome is consistent with Hawkesby's (2017) investigations, but it differs significantly from Lucky's findings (2017)

In sum, the results showed that the real gross domestic product growth rate as measured by RGDP and the ARDL Co integrating and Long Run co-efficient of inflation as assessed by INFR had statistically significant positive effects on financial stability in both the short and long runs.According to the ARDL regression result, balance of payments, as measured by BOP, has a short-term negative influence on financial stability but a long-term positive impact.In contrast, the statistical significance criteria for capital adequacy was only partially passed.While BOP was found to be statistically insignificant in both the short and long runs, the ARDL Co-integrating and Long Run Co-efficient of Capital Adequacy (CAP) had a detrimental impact on the financial stability proxy on both the short and long runs.On both the short and long terms, the ARDL Co integrating and Long Run co-efficient of liquidity (LIQ) is positively sloped and statistically significant at the 5% level of significance; on the long term, the ARDL Co integrating and Long Run co-efficient of sensitivity to market risk(SENS) has a positive impact on the bank stability measure.Only in the short run does sensitivity to market risk satisfy the test of statistical significance.

6. Conclusion

In order to make sure that the banking system might be more successful at supporting the transmission of monetary policy and more resilient in facing a financial crisis, this study looked at the macro-prudential determinant of banks' stability in Nigeria.The analysis made use of information gathered from all of the Nigerian DMBs that were cited between 1990 and 2020.The data is then examined using the ARDL methodology.The study concludes that the capital adequacy ratio, inflation rate, and vulnerability to market risk are the primary predictors of banking stability only in the near run.In Nigeria, liquidity and the rate of real GDP growth are important short- and long-term predictors of bank stability.The findings are consistent with the current approaches taken by the Central Bank of Nigeria (CBN), which is in charge of overseeing Nigeria's banking regulations, particularly in the area of regulatory capital management, which aims to ensure that banks allocate enough risk capital in accordance with their risk-taking activities.

The recommendations that follow are consequential to the study's findings.First and foremost, if the Nigerian economy is to significantly contribute to bank stability, the current economic diversification policy should be given top priority; second, the current rise in inflation should be closely watched because it would further expose the Nigerian banking sector to instability; third, an effective policy mix should be put in place to address the country's current balance of payment imbalance; and fourth, the current increase in the unemployment rate shoul be

addressed given that it is currently increasing the risk of bank instability.Given that hybrid capital is of low quality and that Basel 3 criteria call for high capital, the CBN should put pressure on banks to increase the quality of capital they hold and reduce the amount of it they hold in their capital structures.Additionally, the regulatory authorities should establish measures, policies, and strategies for efficient supervision and guarantee that all banking laws and rules, including the reserve requirement, are strictly followed.

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