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Banking Regulation Effects on African Banks' Stability

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Abstract

The 2008/2009 global financial crisis exposed the fragility of banking regulations, specifically the Basel II Accord in protecting banks from financial failure. As a result of this, the Basel III Accord came to bear. Banks' stability promotes the confidence of stakeholders which is one of the major aims of the global Basel III banking regulations. Despite this, there is limited adoption of this Accord and scant evidence of the effect of Basel III regulations on banks' stability within the African context. This study aims to determine whether the Basel III regulatory requirements at a multi-component level have an impact on the stability of African banks. The study employed the pooled ordinary least square estimator to fit the static panel data model established for the study. Panel data from 45 banks in six African countries were used. The findings revealed that in contrast to the popular expectation of the Basel III Accord, the minimum capital requirement, capital adequacy ratio, and capital buffer premium had a negative and insignificant relationship with the stability of banks within the African context whilst the liquidity coverage ratio stood out significantly with a positive effect on the banks' stability. Based on these findings, the study recommends that African Bank regulators and CEOs should maintain a liquidity coverage ratio that is within the Basel III threshold and increase their current minimum capital requirement above the average of 13.59% to maintain stability and boost stakeholders' confidence.

Keywords

Africa Banks, Capital Buffer, Global Financial Crisis, Liquidity Coverage Ratio, Panel Data, Stability

1. Introduction

The global banks' regulation had some inherent weaknesses and was brought to light by the 2008/2009 global financial crisis. This instigated the proposition of

the Basel III Accord to reduce the likelihood of failures and distress in banking firms, and to promote the economic health of countries and international markets (BCBS, 2010).

More so, banks play a pivotal role in the economy by providing financial intermediation through channelling surplus financial resources from depositors to borrowers of funds who are in deficit (Bank for International Settlements, 2013). Thus, the Basel Accords aim to bring stability to the banking sector by improving global banking regulation and supervision (Bank for International Settlements, 2013). Although these Basel regulations may not be forcefully and legally binding in any country as such, they serve an advisory purpose. Also, they serve as a baseline for individual countries to formulate their bank capital regulations and requirements. The majority of the developed countries ultimately adopt the Basel regulations while other countries make few adjustments or improvements to the Accord to suit their specific needs (Bilal & Salim, 2016).

The Basel III Accord grew large significance amongst the leading countries of the world shortly after the GFC. Gropp and Heider (2010) argued that the Basel Accords have been influential and instrumental in centralising banking regulation, supervision, and capital adequacy standards. More so, due to globalisation, the interdependency of banking operations, and the interconnectedness of banks and businesses amongst countries, the Basel Accords' global acceptance was inevitable.

Authors such as Chiaramonte and Casu (2017) argued that implementing Basel III regulatory requirements with its tighter capital requirements harms the performance of banks as they invest less to meet the minimum capital requirements, which consequentially affects their stability. This implies that with the bank putting more capital aside and not investing it, in the hope to reach and exceed the minimum capital target and capital buffer requirements, the consequential effect falls on the banks' stability. On the contrary, Bilal and Salim (2016) reported that implementing a tighter capital regulatory requirement strengthens the capital base of banks and promotes the confidence of stakeholders in the stability of banks. Although these authors amongst others (Barclay & Smith, 2020; Gavalas & Syriopoulos, 2018; Banerjee & Mio, 2017) have identified the effects and implications of Basel III on the stability of banks, especially from developed countries. These studies, however, document contradicting and inconclusive findings.

Despite the studies already conducted on the determinants of bank stability, the majority of these studies used data from developed nations. Beck and Rojas-Suarez (2019) and Chiaramonte and Casu (2017) argued that the findings as regards the impact of Basel III in developed countries may not apply to African countries because of the differences in the unique country fundamentals such as the political influence in the banking regulations and supervision, central bank legislation and independence, country size, GDP and risk rating, economic factors and local institutional factors such as bank size, and operational jurisdiction amongst others in the African countries. Beck and Rojas-Suarez (2019) added

that the level of political influence on the reserve banks on how the Basel Accord should be adopted is high in some African countries such as Ethiopia and lower in other African countries such as South Africa among others. These unique institutional differences between the developed and the emerging countries justify a separate investigation of the impact of Basel III regulatory requirements on banks' stability within the African context.

Also, while a limited numbers of studies have examined the potential effect of Basel III requirements in Africa; their focus has been on the impact of the Basel III liquidity regulation on banks' profitability with the exclusion of banks' stability (Mashamba, 2018; Vazquez & Federico, 2015; Abdel-Baki, 2012). Similarly, the study of Kombo (2014) relied solely on small-scale survey data in investigating the effect of Basel III on the performance of Kenyan banks. A survey investigation is limited in its generalisation and may not be representative of what is obtainable in other African countries at large.

More so, as indicated by the BCBS (2013) the banks from the developed nations have adopted the Basel III accord in its entirety whilst the majority of the African countries are still on the implementation of the Basel II Accord. However, due to the 2008 GFC, the financial regulation of a few African countries has evolved and taken a different turn. Countries such as South Africa have evolved rapidly in these past years from the traditional approach of regulating banking activities to adopting the global macro-prudential guidelines of the Basel III Accord (SARB, 2013). Also, a few other African countries such as Nigeria, Uganda, Malawi, Kenya, and Tanzania have mirrored largely the global best practices of the Basel III Accord. The article drew its data specifically from listed banks of six African countries that have adopted the Basel III regulatory requirements namely South Africa, Nigeria, Kenya, Tanzania, Uganda, and Malawi. Accordingly, the main purpose of this article is to examine whether the Basel III regulatory requirements indeed impact the stability of the selected listed African banks.

This study contributes significantly to the literature in several ways. Empirical studies on Basel III Accord and bank stability are scarce in the African literature due to the lack of implementation of the Basel III Accord yet in several African nations. Prior studies largely investigated the impact of the Basel I and II Accord on the financial performance of banks, neglecting the banks' resilience in form of stability. Additionally, few empirical works done in the African context have attempted to examine the impact of the Basel III Accord except for the new liquidity regulatory framework. This study exhaustively investigated the impact of the liquidity coverage ratio and other Basel III requirements on the stability of 45 listed African banks. The study, therefore, sheds light on the interrelationships between the Basel III Accord and banks' stability so that some recommendations on whether to adopt the Basel III Accord or which part of the Accord should be adopted by other African nations can be drawn.

Following the brief introduction, Section 2 provides a brief literature review regarding the interrelationship between Basel III Accord and bank stability. Sec-

tion 3 presents the research methodology used in the study. Section 4 discusses the empirical findings whilst Section 5 concludes.

2. A Brief Literature Review

Banks hold capital to finance their operational activities and to maintain their stability and going concerns (Berger & Bouwman, 2013). The Basel III regulations have stricter capital requirements to protect banks from financial and economic shocks and to help them absorb risks such as credit and liquidity risks. Al-Najjar and Hussainey (2011) opine that many countries insure deposits as a safeguard to mitigate the risk of customers' unannounced notice of withdrawals of funds leading to bank operational failure and instability. The safety and soundness of banks in terms of their stability and going concern characteristics are a concern for the public and the economy at large because bank failure negatively affects the whole economy (Gropp & Heider, 2010).

Romano (2014) added that Basel III Accord has promoted the financial soundness and stability of banking institutions, enhanced the risk coverage to include liquidity and counter-cyclical risks, and is forward-looking as it addresses bank-specific risk associated with portfolios and the macro-economic environment. The Accord also ensures strict governance of bank operational activities, detailed reporting and compliance and reduces the dependency on rating agencies. To better understand the impact of the Basel III Accord on banks stability, the multi-level components of the Basel III Accord which are improved capital requirements, capital buffers, leverages and liquidity requirements are tested in this study.

Previous studies on the impact of the Basel III accord and bank stability are summarised by the fact that the impact of such a major financial regulation restructuring is two-way. On the one hand, imposing stricter regulation on the banks implies benefits in terms of an increased resilience of the banking sector but, on the other hand, this increased resilience is dearly purchased by the costs of restricting banking operational and investment activities and, thus, its contributive supportive capacity to the economy as a whole decline. This poses a major challenge to the bank in finding the right balance between improving the banks' resilience and stability through a tighter capital requirement and the inherent cost which impedes the banks' operational activities. A brief review of relevant literature in this regard is discussed in turn.

In a recent study conducted by Abbas and Younas (2021), they examined the impact of the Basel III regulatory capital buffer on the stability and growth of large insured commercial banks in the USA using a two-step system Generalized Method of Moment (GMM) technique. Their study entails using a comprehensive dataset covering pre- and post-Global Financial Crisis (GFC) from the period 2002 to 2018. They observed that a countercyclical relationship exists between capital buffer and the stability and growth of the large US banks. They inferred from their findings that the countercyclical relationship is prominent amongst

the well-capitalised banks as compared to lowly capitalised banks. Also, in the case of low-liquid banks, counter-cyclicality is more significant than high-liquid banks. Their result was consistent and robust with the use of the tier-1 capital buffer ratio on banks stability and growth. Also, Vazquez and Federico (2015) found that an increase in banks minimum capital requirements according to Basel III increases banks stability amongst the British banks. Similarly, Ugwuanyi and Enah (2015) and Ozili (2015) reported that having a higher capital base increases the Nigerian bank stability. According to them, the growth and stability of the bank are largely due to having more than 6% risk-weighted assets in reserves to meet unexpected economic uncertainties following Basel III. Ozili (2015) added that the stable Nigerian banks did not only meet the Tier 1 and Tier 2 capital requirements, nor the local N25 billion capital requirements set by the Central Bank of Nigeria but also met the Basel III liquidity requirements.

In contrast to the positive results obtained and reported by Vaquez and Federico (2015), Ugwuanyi and Enah (2015) and Ozili (2015), authors such as Banerjee and Mio (2017) reported otherwise. Banerjee and Mio (2017) showed that the Basel III Accord has no significant impact on the stability of British banks whilst Giordana and Schumacher (2017) found a negative relationship between the Basel III liquidity requirements and the Luxembourg banks' stability. Giordana and Schumacher (2017) emphasised that the stricter Basel III requirements caused the Luxembourg banks to be more vulnerable to failure. They explained that the tighter liquidity requirements restrict the profitable banking activities and investments which invariably severe their financial performance and stability. Also, the study of Mashamba (2018) on the effect of Basel III liquidity regulation on banks' profitability in emerging economics showed a similar result. The study sampled 40 banks operating in 11 emerging markets over the period 2011 to 2016. The study employed the GMM estimator in analysing the study variables, the empirical result demonstrated that regulatory pressure stemming from the liquidity coverage ratio requirement diminished the profitability of banks in emerging markets which invariably negatively affects the stability of the banks in the emerging markets.

In sum, previous studies have concluded with controversial and inconclusive results about the impact of the Basel III Accord on bank stability. For instance, studies such as those of Abbas and Younas (2021), Vazquez and Federico (2015), Ugwuanyi and Enah (2015), Ozili (2015) concludes that the Basel III regulatory requirements have a positive impact on banks' stability whilst studies of Banerjee and Mio (2017), Mashamba (2018), and Giordana and Schumacher (2017) concludes that Basel III regulatory requirements have no effect or harm banks' stability. Thus, based on the literature reviewed, no significant work has been performed on a multi-component level of Basel III Accord, rather prior studies investigate a one-way relationship between the banking system stability and the individual component of the Basel III Accord. While work has been published on the impact of the Basel III Accord on banks financial performance within the

developed nation and scant studies on individual African countries, we have not come across any research that investigates the direct impact of the Basel III Accord on a multi-component basis on the stability of banks from African nations that have adopted the Basel III Accord. Also, in terms of time frame, previous studies often looked at the pre-GFC and post-GFC data in comparison or the combination of the Basel II and III Accord and the banking stability.

Based on the empirical pieces of evidence aforementioned, the study hypothesised that the component of Basel III Accord, namely, Minimum Capital Requirement (MCR), Capital Adequacy Ratio (CAR), and Capital Buffer Premium (CBP) would be significantly positively associated with banking stability. The study also postulates that the bank stability would have a significant positive relationship with the Basel III liquidity requirements (represented by the liquidity coverage ratio). This study, therefore, examines the interrelationships between multiple components of the Basel III Accord and African banks stability post-GFC.

3. Methodology

3.1. Data and Variable Definition

This paper aims to investigate the relationship between the multilevel component of the Basel III Accord and banking stability in Africa by covering a data set of 45 listed banks from six African countries for the period 2010 to 2019. Although there are 54 African countries, the study only focused on 6 of these countries that have adopted the Basel III accord, namely, South Africa, Nigeria, Kenya, Tanzania, Uganda and Malawi. The study used the standardised audited financial statement of the 45 listed banks which were obtained from the IRESS database.

The summarised definitions of variables are shown in Table 1. Rajhi and Hassairi (2013) define bank stability as the ability of a bank to withstand both internal and external shocks and economic and financial distress. Bank stability is largely measured by the computation of bank Z-score (Rajhi & Hassairi, 2013; Fiordelisi & Mare, 2014). The important parameters needed when calculating the Z-score of a bank includes the ROA, equity/assets ratio and the standard deviation of ROA. Fiordelisi and Mare (2014) opine that the higher the Z-score the more stable the bank. This study adopted the Z-score computation as the measure of bank stability.

Following the Basel III regulatory requirement (BCBS, 2013), this study used the multi-level components of the Basel III Accord namely the Minimum Capital Requirement (MCR), Capital Adequacy Ratio (CAR), Capital Buffer Premium (CBP) and Liquidity Coverage Ratio (LCR) as the main influence of African bank stability.

3.2. Estimation Methods and Model

This research adopted the panel data method. According to Malik and Rafique (2013), Nigist (2015) and Shumet (2016), panel data methodology pools obser-

vations on a cross-section of subjects over a particular period which makes each variable studied repeatedly over some time. This methodology allows for an increase in the amount of data because it combines the data between the cross-sectional and time-series data. This increases the degrees of freedom and decreases the collinearity between explanatory variables, which leads to greater efficiency of the econometric estimation. This methodology also allows the researcher to analyse different econometric issues that cannot be accurately studied using only longitudinal or time series methodology.

The main advantage of this methodology is that it improves the estimation efficiency of the data set and widen the scope of concluding, it is more informative than pure time series or cross-sectional data analysis making it well suited to detect the dynamics of change, and also allows for usage of diverse suitable estimators which can be categorised under the static and dynamic data estimators.

The study applied the static panel data model to test the relationship between the Basel III Accord and bank stability. The static panel data model is suitable over the dynamic panel data model in this instance because the present value of bank stability is not affected by its previous year's values.

Though a model is not without its limitation, the major drawbacks of the panel data model are heterogeneity, sample selectivity biases, and short time-series dimension problems (Malik & Rafique, 2013). The researcher, therefore, conducted various tests to verify the presence or absence of multicollinearity, heteroscedasticity and cross-sectional independence. In the presence of any of the panel data model errors, it is necessary to introduce corrective measures such as differencing the data set in order not to compromise the reliability of the results.

There are a number of estimators used in fitting the static panel data model such as the pooled Ordinary Least Square (OLS), Fixed Effect (FE), and the Random Effect (RE) (Francis & Osbome, 2012; Lee & Hsieh, 2013). The pooled OLS estimator, on the one hand, uses a constant intercept across all cross-sectional units and assumes equal slope and intercepts for all observations (Torres-Reyna, 2007). Thus, the estimator suffers from the problem of unobserved heterogeneity among the unit of analysis. However, this problem can be easily resolved by differencing the data set. The FE estimator, on the other hand, assumes that the sample is non-random, and the variables have constant slopes but different cross-sectional intercepts and can handle unbalanced panel data. The major challenge with the FE estimator is the problem of time-constant heterogeneity which can be overcome by introducing dummy variables, which is usually referred to as the Least Square Dummy Variables (LSDV) estimators (Arellano & Bover, 1995). The RE estimator is used to address the assumption that the error term follows the classical assumptions, thus the individual differences in the variable intercepts are captured by the error term. The main advantage of the RE estimator is that it retains both the observed individual heterogeneity and the n-degree of freedom in the regression model while the FE estimators drop and lose the individual heterogeneity and the n-degree of freedom (Dougherty, 2006).

To select the appropriate estimator amongst the pooled OLS, FE and RE to fit the static model equation, the F-test, Hausman-Wu and Breusch and Pagan test were conducted. These models, estimators and statistical tests were implemented in the STATA 15 econometric software.

To test the formulated hypotheses empirically and take into account the defined methodology, the following model was defined:

$$\text{Z-score}_{i,t} = \beta_0 + \beta_1 \text{MCR}_{i,t} + \beta_2 \text{CAR}_{i,t} + \beta_3 \text{CBP}_{i,t} + \beta_4 \text{LCR}_{i,t} + \varepsilon_{i,t}$$

In the above model regression equation, β_0 represents the intercept/slope parameters, while β_1 - β_4 represents the coefficient of the variables and ε_t represents the error term. The model equation is aimed at testing whether banks stability which is represented by its Z-score computation is affected by the Basel III regulatory requirements.

4. Discussion of Empirical Results

To carry out the data analysis in this study, static panel data and econometric methodology using STATA 15 were employed. The descriptive statistics and normality test of the data used were presented in Table 2.

Table 2 presents the summary statistics for the dependent and independent panel data variables. The panel data variables were constructed from the data drawn from the annual financial statements which were obtained from the IRESS database. To eliminate outlier observations and the most extremely misreported data, all variables were winsorised to the 99th percentile. The dependent variable is defined as Z-score which is a measure of bank stability. The independent Basel III Accord variables in Table 1 are defined as follows: MCR denotes the minimum capital requirement; CAR denotes the capital adequacy ratio; CBP denotes the capital buffer premium, and LCR denotes the liquidity coverage ratio. All the variables are well defined in Table 1.

From observation of the descriptive statistics and normality test results, it is possible to conclude that the African banks' MCR, CAR, CBP and LCR on average are 13.59%, 29.37%, 15.78% and 181.72% respectively. Firstly, a higher MCR implies that on average, African banks keep a minimum of Tier 1 and Tier 2 capital of 13.59% which is higher than the minimum capital requirements indicated in the improved capital regulatory framework of Basel III (Bank for International Settlements, 2013). Secondly, having a higher CAR indicates that African banks keep their capital adequacy ratio far above the 8% of the CET 1 ratio and Tier 1 capital ratio prescribed by the Basel III Accord. More so, the comparison of the CAR and MCR indicates that African banks on aggregate held a higher buffer premium capital. Lastly, the high LCR implies that for the period under study, the African banks held excess of the LCR threshold of liquid assets to withstand liquidity stress. This reduces the chances of a future banking crisis and associated losses of economic output in the short term.

Moreover, the minimum capital requirement, capital adequacy ratio, capital

Table 1. Definition of the dependent and independent variables.

S/N	Variables	Acronym	Variable Measurement
	Dependent Variables		
1	Stability	STAB	Z-score = (ROA + ratio of equity to total asset)/standard deviation of ROA
	Basel III regulatory requirements: Independent Variables		
2	Minimum Capital Requirement	MCR	Minimum ratio of Tier 1 + Tier 2
3	Capital Adequacy Ratio	CAR	Tier 1 + Tier 2/Risk Weighted Asset
4	Capital Buffer Premium	CBP	Actual capital (core capital plus supplementary capital) less minimum regulatory capital.
5	Liquidity Coverage Ratio	LCR	HQLA/ENCO
6	Prescribed Minimum Capital Requirement	pMCR	As Prescribed by Basel III Accord
7	Prescribed Capital Adequacy Ratio	pCAR	As Prescribed by Basel III Accord
8	Prescribed Capital Buffer Premium	pCBP	As Prescribed by Basel III Accord
9	Prescribed Liquidity Requirements	pLCR	As Prescribed by Basel III Accord

Source: Authors Compilation (2022).

buffer premium and liquidity coverage ratio are variables with little concerning volatility, as their standard deviations are lesser than their mean values which suggest some level of stability. Also, the mean value of the Z-score is 326.52%, and according to Rajhi and Hassairi (2013) and Fiordelisi and Mare (2014), the higher the Z-score the more stable the bank is. This implies that on average, the African banks under study are relatively stable. However, the African bank stability is highly volatile because the standard deviation of the Z-score parameter is lesser than its mean value. More so, looking at the descriptive statistics in Table 2, the study found there is little or no difference in the mean and median for most of the variables. This is likely because the study only used data available after the GFC as well as the data set only covers Africa countries that share similar stages and levels of economic development.

Additionally, the skewness normality test of data integrity shows that all variables are evenly distributed with skewness coefficients close to zero. All variables are skewed to the right, which implies that the variables are asymmetrically distributed where the mean, median and mode do not occur at a regular frequency or the same point (Obadire et al., 2022; Joanes & Gill, 1998). Also, the kurtosis coefficients for most variables have values less than 3 which are indicative of no positive excess kurtosis following a light-tailed distribution known as a platykurtic distribution. With exception to this general light-tailed distribution is the capital buffer premium with a kurtosis coefficient of 6.0737, which follows a heavy-tailed distribution, thereby exhibiting one of the important characteristics of financial and economic panel data, namely that of leptokurtosis (Obadire, 2018; Sigauke, 2014). Hence, the study transformed the capital buffer premium variable by differencing it to its 1st order level to remove any presence

Table 2. Summary statistics and normality test results of the variables.

Variables	Mean	Standard deviation	Minimum	Maximum	Skewness	Kurtosis
Z-score	3.2652	15.5347	0.0013	165.1770	0.0886	0.8650
MCR	0.1359	0.0620	0.0628	0.2090	0.0054	0.0204
CAR	0.2937	0.1851	0.1056	0.4818	0.0156	0.0518
CBP	0.1578	0.1231	0.0428	0.2728	0.0950	6.0737
LCR	1.8172	1.1984	0.7053	2.6991	0.0251	0.1170
No of Obs.	450					

Source: Authors Compilation (2022).

of non-stationarity and unit root in the data, making it suitable to fit the panel data regression model.

Following established procedures, the study conducted a multicollinearity test to ascertain that there is no existence of multicollinearity in the predictor variables which could lead to a wrong understanding of the coefficient's statistical significance. The test was done by calculating the Variance Inflation Factors (VIF) for the variables in the model equation. The VIF test result was reported in Table 3.

Table 3 presents the results of the multicollinearity test for the bank stability model. The test was done by calculating the variance inflation factors for the variables in the bank stability model equation. The variable definition follows the same as presented in Table 1 and Table 2 for the exception of the DCBP which denotes the capital buffer premium differenced on the 1st order level.

The VIF for the relationship between the independent and dependent variables as shown in Table 3 are less than 10 with a mean VIF of 1.84. This is evident that there is no existence of multicollinearity in the independent variables associated with the regression models.

Choosing a suitable estimator to fit the regression model, the F-test, Breusch and Pagan test and the Hausman specification tests were performed. The F-test is used to identify if there is an existence of fixed effects in a regression model. If the H_0 is rejected and the P-value is statistically significant, then the FE model is suitable. The Breusch and Pagan test is used to identify if there is an existence of random effects in a regression model. If the H_0 is rejected and the P-value is statistically significant, then the RE model is suitable. However, in a situation where there are no fixed or random effects in a regression model, that is; the P-value of both tests is statistically insignificant; the pooled OLS model is favoured.

Also, peradventure there are fixed and random effects in a regression model, that is; P-value of both tests is statistically significant; the Hausman specification test is used to select the most suitable estimator between the FE and RE. A fixed-effects model is chosen if the H_0 of the Hausman test is rejected, that is; the P-values of the Hausman tests are statistically significant and vice versa.

Table 3. Multicollinearity test results for the Z-score model.

Variables	Z-score	
	VIF	1/VIF
MCR	2.85	0.3507
LCR	1.91	0.5222
CAR	1.56	0.6393
DCBP	1.03	0.9737
Mean VIF	1.84	

Source: Authors Compilation (2022).

Based on the aforementioned selection criteria of the suitable estimator between the pooled OLS, FE and RE, the diagnostic test results for the F-test and Breusch and Pagan test were statistically insignificant with 0.99 and 0.02 values respectively. This implies that no existence of fixed or random effects with no endogeneity problem, hence the pooled OLS estimator was favoured and selected as a good fit to report the results for the bank stability specification model. The results of the specification tests are outlined in Table 4.

Table 4 presents the results of the F-test and Breusch and Pagan L-M test for the bank stability model. The markings ***, **, and * indicate significance levels at 1%, 5% and 10% respectively.

Based on the enunciated selection criteria and procedure, the bank stability model was fitted by the pooled OLS estimator. The results are presented in Table 5.

Table 5 shows the regression results of the stability regression model. Table 5 shows the estimation results for the relationship between the stability of African banks and the Basel III regulatory requirements. The regression model was fitted with the pooled OLS estimator, and all the coefficients were estimated at a 99% confidence level. The variable definition follows the same as presented in Tables 1-3. The t-statistics for the pooled OLS model is presented in parentheses. The markings ** and * indicate significance levels at 5% and 10% respectively. The static panel data estimate test results are shown in Table 5.

The results in Table 5 show that there is a significant negative relationship between minimum capital requirements and the stability of African banks. Whilst the coefficient for the capital buffer premium is also negative but rather statistically insignificant at all levels for the measure of bank stability. This implies that with the tighter minimum capital requirement as proposed by the Basel III Accord, leading to a higher capital buffer premium, consequentially causes a deterioration in banks' stability. This result contradicts popular studies such as those of Moudud-Ul-Huq (2019), Lotto (2018), Šútorová and Teplý (2013) and Chortareas et al. (2012), and the proposition of the Basel III Accord that stricter and higher regulatory requirements and buffer premiums are expected

Table 4. Specification tests.

Type of test	Random effects	Fixed effects
F-statistic test		0.99
BP L-M test	0.02	
Hausman test	N/A	N/A

Source: Authors Compilation (2022).

Table 5. Static panel regression results for the stability regression model.

Variables	Pooled OLS Model
	Z-score
MCR	−3.0662* (−0.14)
CAR	4.9584 (0.95)
DCBP	−4.1247 (−0.19)
LCR	1.2244** (1.44)
Obs.	450
Adjusted R^2	0.9101

Source: Authors Compilation (2022).

to keep the bank stable and against the market and economic shocks (BCBS, 2010). In another light, the results of the study are consistent with the findings of Banerjee and Mio (2017) and Vaquez and Federico (2015) of British banks who found no significant impact of the Basel III buffer premiums on the stability of banks. Similarly, the study of Giordana and Schumacher (2017) found a negative relationship between the Basel III capital buffers and the Luxembourg banks' stability.

The negative result of the study is argued on the premise that as African banks subscribed to the tighter and higher minimum regulatory capital requirements proposed by the Basel III Accord, this consequentially led to a higher buffer premium, which severe the profitable lending activities of the bank and causing other investment constraints and invariably severe their stability. As a result of this, the study, therefore, argues that there is a significant negative relationship and a non-significant negative relationship between the Basel III minimum capital requirements, capital buffer premium and the stability of African banks.

On another note, there is a non-significant positive relationship that exists between the capital adequacy ratio and the African bank stability, as shown in Table 5. This implies that with the adoption of the Basel III CAR, the African banks are expected to exhibit operational stability, though the result of the current study

shows that the CAR has no significant impact on the African banks' stability.

More so, the liquidity coverage ratio is found to be positively associated with the stability of African banks in the model result presented in Table 5. This implies that an increase in the Basel III liquidity requirement resulted in a consequential increase in the stability of African banks. This means African banks with well-performing liquidity ratios are stable and this promotes confidence to the banks' stakeholders. In short, this lends credence to the argument that banks will remain stable provided their liquidity ratio is kept in balance. This is supported by the aggregate mean-score result of the African bank under study presented in Table 2, which shows that on average, the liquidity coverage ratio kept by the African banks was 181.72% which is more than the liquidity coverage ratio threshold proposed by the Basel III Accord for the liquid assets to withstand liquidity stress.

Abbas and Younas (2021) and Ha and Quyen (2018) found that with fulfilment to the expectation of the Basel III Accord, banks from countries with more strict requirements and adherence to the Basel III liquidity requirements are more stable as compared to those banks from countries with flexible and unstructured liquidity and capital regulations mainly because stricter liquidity requirements create a liquidity buffer giving banks from countries with structured requirements cushion against liquidity stress and crisis which boost the confidence of the depositors and other stakeholders about the banks' stability.

On the contrary, Giordana and Schumacher (2017) did not find a positive relationship between the improved liquidity requirements and banks stability. They reported a negative effect of Basel III liquidity requirements on the Luxembourg banks' stability. They added that the Basel III requirements caused the Luxembourg banks to be more vulnerable to failure. They explained that the tighter liquidity requirements place a constraint on the profitability of the bank which invariably impairs its stability. As a result of this, the study, therefore, argues that there is a significant positive relationship between the Basel III liquidity requirements and the stability of African banks.

In sum, as pointed out in Table 2, the selected African banks in this study are relatively stable with a mean score of 3.2652% but highly volatile with a higher standard deviation over its mean. This is likely to be caused by the mixed and conflicting impact the components of the Basel III accord (minimum capital requirement, capital adequacy ratio, capital buffer premium and liquidity requirements) has on the African banks' stability as presented in Table 5.

To assess the effectiveness and impact of the regression results presented in Table 5, a robustness check was carried out, by conducting a model variation test. Here, the study replaced the actual regulatory capital and liquidity requirements held by the selected African banks with the Basel III prescribed minimums. This test was conducted to ascertain the impact of the Basel III prescribed minimums on the stability of the selected listed African bank. From the test results, the study deduced the most viable option between the Basel III prescribed minimums and the actual capital held by the selected African banks.

The robustness check regression model used the Basel III prescribed minimum of pMCR, pCAR, pLCR and pDCBP as the independent variables. The Z-score parameter as earlier used was maintained. Following the same procedure, estimator selection tests were conducted, and the suitable selection criteria were followed as enunciated in Section 3 of the study. The misspecification errors inherent in the regression models such as the heteroscedasticity, cross-sectional dependence, outliers, and multicollinearity were also adjusted in line with the previous approach in Section 3. The pre-estimation results and specification tests such as the VIF test results, Breusch and Pagan LM test for random effects, and Hausman test results were reported in the **Appendices** (**Tables A1-A3**). The VIF for the relationship between the independent and dependent variables are less than 10 with a mean VIF of 3.86 (refer to **Appendix A1**). This is evident that there is no existence of multicollinearity in the independent variables associated with the models. Using the Basel III prescribed minimum as the independent variable in the regression model, the model was fitted using the pooled OLS estimator. The regression results were presented in **Table 6**.

Table 6 shows the regression results of the Basel III prescribed minimums. **Table 6** shows the estimation results for the relationship between the stability of African banks and the Basel III prescribed minimums. The regression model was fitted with the pooled OLS estimator, and all the coefficients were estimated at 99% confidence level. The bank stability was measured by the computation of Z-score. The independent variable ^{P}MCR denotes the prescribed minimum capital requirement; ^{P}CAR denotes the prescribed capital adequacy ratio; ^{P}DCBP denotes the prescribed capital buffer premium differenced on the 1st order level; and ^{P}LCR denotes the prescribed liquidity coverage ratio. The t-statistics for the pooled OLS model is presented in parentheses. The markings * indicate significance levels 10%. The static panel data estimate test results are shown at the bottom of **Table 6**.

Table 6. Robustness check.

Variables	Pooled OLS Model
	Z-score
^{P}MCR	−33.2052*
	(−0.33)
^{P}CAR	−46.7588
	(−1.70)
^{P}DCBP	−7.0818
	(−0.11)
^{P}LCR	0.5819
	(1.04)
Obs.	450
Adjusted R^2	0.6101

Source: Authors Compilation (2022).

The results indicated that there was no positive significant relationship between the Basel III prescribed minimums (MCR, CAR and DCBP) and the stability of the selected African banks. However, at a 10% level of significance, a negative relationship exists between the prescribed MCR and bank stability. This implies that maintaining the prescribed MCR has a higher consequential negative impact and declining effect on the stability of African banks as compared to the negative impact result presented in Table 5.

By contrast, the Basel III regulation expects that an increased and stricter capital requirement above the Basel II capital requirements will serve as a confidence booster, providing investors and depositors with the confidence of stability and continued operation (Aspal & Nazneen, 2014; BCBS, 2010). The Basel III prescribed MCR, CAR and CBP, has however proven inadequate to promote the expected confidence and stability of the selected African banks. The same fate goes for the prescribed LCR, even though the robustness regression check result shows a positive relationship between the banks' stability and the prescribed LCR, the relationship is insignificant and can be addressed as no impact.

Concerning the results from Table 5, keeping a reasonable higher MCR reduced the declining effect on the bank stability and African banks can keep increasing their actual MCR to an extent of positive effect. In this sense, Vaquez and Federico (2015) assert that an increased MCR will increase the stability of British banks. According to the results in Table 2, the selected African banks kept an average MCR of 13.59% which consequentially reduced the negative effect of the prescribed MCR on the stability of the selected African banks. Hence, it is recommended that African banks should increase their MCR above the average of 13.59%. The expected stability and bank confidence can therefore be attained if the selected African bank keeps a minimum capital requirement that is above 13.59%, but lesser than 20.90% (see Table 2).

5. Conclusion

The study employed the pooled OLS static panel-based estimator to investigate the relationship between the Basel III multi-level regulatory requirements and the stability of African banks. The study selected listed banks from six African countries that have adopted the Basel III Accord. The results of the panel data regression model showed that amongst the component of the Basel III Accord, only the liquidity coverage ratio plays a significant role in the stability of the banks understudied.

In contrast to the popular expectation of the Basel III Accord, the minimum capital requirement, capital adequacy ratio, and capital buffer premium had a negative and insignificant relationship with the stability of banks within the African context. This is owned to the premise that as African banks subscribed to the tighter and higher minimum regulatory capital requirements proposed by the Basel III Accord, this consequentially led to a higher buffer premium, which severe the profitable lending activities of the bank and caused other investment con-

straints and invariably severe their stability. The result of the robust check has also clearly shown that the Basel III prescribed MCR, CAR, and CBP is inadequate to promote the expected confidence and stability of the selected African banks.

This study, thus, provides relevant information and guidance for the African Bank regulators, and CEOs in making informed decisions regarding the stability of the bank. The study recommends that banks should maintain their current actual liquidity coverage ratio and increase their current minimum capital requirement above the average of 13.59% to remain stable and boost stakeholders' confidence.

This research has important implications as it addresses the gap in the literature on the multi-level component of the Basel III Accord as a determinant of bank stability by showing evidence to support that the liquidity coverage ratio has significant importance in the stability of African banks. This not only adds to the literature on the Basel III Accord and bank stability of financial services firms, which area has not been extensively and conclusively investigated especially within the African context but also validates the aim of the new liquidity standards published by the Basel Committee with a focus on reducing bank failure and liquidity crisis. This implies that the selected African banks are stable because they adopt liquidity requirements. Thus, adopting the liquidity requirements of the selected African banks gave the banks the capacity to have better-quality lending with lower interbank lending rates due to the banks' interconnectedness. That is, as liquidity ratios rose in line with Basel recommendations, interbank lending rates fall. This consequentially helps the growth of the African economy because lower interbank lending rates transcribe to lower commercial lending rates and more business, and the economy at large can access the funding without leaving the bank stability fractured or at risk. Hence, the liquidity requirements which led to the stability of the selected African banks will increase the confidence of bank investors in the strength and stability of the banks' balance sheets, making the banks safer and better to survive and thrive under any financial stress.

The study, however, has some limitations that conditioned the research. The first limitation is the small dimension of the sample which consisted of only 45 listed banks. This is because the study focused only on the African countries that have adopted the Basel III regulatory framework. Future studies can use a larger sample size with the expectation that other African countries would have adopted the Basel III regulatory requirements by then. Lastly, the study is limited to some Basel III regulatory requirements such as the minimum capital requirements, capital adequacy ratio, capital buffer premium, and liquidity coverage ratio. These requirements have been largely adopted within the context of African banks. It is recommended that future studies should test the significance of other revised sections of the Basel III regulatory requirements such as the minimum haircut floors for security financing transactions, standardised credit risk mitigation ap-

proach, credit valuation adjustment framework, securitisation of non-performing loans, and models to counterparty credit risk amongst many others, provided they are adopted within the African context, as they might prove yet important. The current study could not consider these revised sections because they are recent amendments mostly made to take effect from the year 2023.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated universities or professional bodies of the authors.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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Appendix

Table A1. VIF result for the robustness test results.

Variables	Z-score	
	VIF	1/VIF
^{P}MCR	5.01	0.1997
^{P}LCR	4.95	0.2019
^{P}CAR	3.81	0.2622
^{P}DCBP	1.66	0.6024
Mean VIF	3.86	

Table A2. The Breusch and pagan L-M test results—robustness tests.

Z-score [bankcode, t] = Xb + u [bankcode] + e [bankcode, t]		
Estimated results	Var	Sd = sqrt (Var)
z-score	2,456,571	1567.345
e	2,443,162	1563.062
u	0	0
Test: Var(u) = 0		
	chibar2(01) =	0.00
	Prob > chibar2 =	1.0000

Table A3. Hausman specification test– Robustness Test.

	Hausman fixed_group random_group			
	Coefficients			
	(b) Fixed_group	(B) Random_group	($b − B$) Difference	sqrt(diag($V_b − V_B$)) S.E.
^{P}MCR	−33.20523	−33.20523	−4.68e−12	12.13028
^{P}CAR	−156.7588	−156.7588	5.46e−12	11.16027
^{P}CBPL	7.081812	7.081812	−2.45e−12	7.53565
^{P}LCR	15.58197	15.58197	−3.55e−14	1.817164

b = consistent under H_o and H_a; obtained from Xtreg; B = inconsistent under H_a, efficient under H_o; obtained from Xtreg; Test: H_o: difference in coefficients not systematic; Chi2(4) = ($b − B$) [($V_b − V_B$)$^{−1}$]($b − B$) = 0.00; Prob > chi2 = 1.0000.