PRUDENTIAL REGULATIONS AND FINANCIAL PERFORMANCE OF COMMERCIAL BANKS IN SIERRA LEONE

[1]Abdullah Bah, [2]Dr. Richard E.O Pearce, [3]Ambalieu Barrie

[1,2]Department of Banking and Finance, [3]Department of Accountancy
Institute of Public Administration and Management (IPAM)
University of Sierra Leone
AJ Momoh Street, PO Box 570, Freetown, Sierra Leone.

Abstract- **The study sought to assess the impact of prudential regulations on financial performance of commercial banks in Sierra Leone. Specifically, the research investigated the effect of liquidity regulation, credit risk regulation, and capital adequacy regulation on commercial banks' financial performance. An explanatory research design was used with all 14 licensed commercial banks in Sierra Leone targeted for the study population. Secondary data was obtained from audited commercial banks' financial statements and from the Central Bank of Sierra Leone for 20 years between 2002 and 2022. Panel data was utilized and was then analysed using panel regression and descriptive analysis. The study found liquidity regulation have a positive and insignificant effect on bank`s performance in Sierra Leone. In addition, The study also concludes that Non-performing loans have a negative and insignificant effect on bank`s performance in Sierra Leone. Finally, capital adequacy regulation was also discovered to have a positive and significant effect on bank`s performance in Sierra Leone.The study recommends that policy makers through the central bank of Sierra Leone should review and improve on the liquidity regulation of commercial banks in Sierra Leone. This will in turn facilitate meeting of customers' withdrawal demands and short term obligations while improving the commercial banks' financial performance. In addition, managers in commercial banks should ensure that total loans to total deposits ratio remains low as a way of ensuring that their institutions are able to meet monthly obligations.**

*Keywords***: Prudential, Regulations, Financial Performance, Commercial banks, JEL Classification: F14, F18, G14, G21,**

1.0   INTRODUCTION
1.1 Financial intermediation of commercial banks
Commercial banks are vital as they perform key functions in economic growth of nations across the globe. For example, they channel funds and allocate resources consistently from savers to different investors (Okoth.V, 2013). Banks are usually able to accomplish this if they are able to get sufficient money to pay off their total operating expenses. The implication of this assertion is that for sustainable financial intermediation, commercial banks are required to be profitable and by extension have good financial performance. Beyond this role of intermediation, banks' financial performance influences the country's economic growth significantly (Alemu., 2015). According to (Thatcher, 2002) regulation may either improve or destroy business's ability to operate.

Commercial banks' primary objective, from a global point of view is to enhance financial performance by recognizing activities linked with low and high financial returns. (Akani, et al., 2016) argue that government as well as policy makers have expressed concerns by making great contributions to revive ailing and liquidating firms in effort to rebuild investors and shareholders trust. Banking industry plays essential role in non-financial and financial factors of production and hence in economic growth of a country. From a regional perspective, commercial banks located within Sub-Saharan Africa over the years were more profitable than other commercial banks situated in various parts of the world. Their average Return on Assets (ROA) was reported at 2% which is considered relatively high (Flamini, et al., 2009). The reason behind the high profitability was due to investment in uncertain ventures. Additionally, the high profits were hinged on the fact that banking business in the region was characterized by huge gap existing between the financial services' supply and demand (Ahmed, 2015) As a result of that, the SSA had a small number of banks in contrast to the need for financial services; this subsequently leads to low bank competition and as such high rates of interest were charged particularly by banks. Moreover, this is the case within West Africa, where a small number of government financial institutions control a major percentage of the market (Ongore & Kusa, 2013).

In the context of Sierra Leone, the performance of commercial banks has been declining. Various banks have been put under receivership by the Central Bank. The BSL indicated that it gave a closer check to the credit and liquidity risks

inherent in the banking industry as they were attributed as the major causes of banks going under receivership (BSL, 2019) Despite the slight improvement recorded in bank profitability in the year, 2020, FI Bank now Vista bank was as well put under receivership by the regulator.

A country's Central bank or Federal Reserve act as regulator to commercial banks through introduction of prudential guidelines with a view to creating an efficient and effective performance of commercial banks, protect depositor's funds and mitigate possible systemic risks in the economy (Svensson, 2018). Different prudential guidelines are introduced by the lender at different times to serve emerging issues over time and these prudential guidelines vary depending on the prevailing condition in a country. It is expected that proper implementation and adherence to the prudential guidelines by commercial banks will result in seamless operations, reduce the agency cost and therefore affect both their short-term and long term operations (Allen & Gale, 2014). However, the number of prudential guidelines in a country varies and therefore, it is anticipated that the way they affect commercial banks' performance differs from one country to another.

1.2 Banking Sector in Sierra Leone

Activities in Sierra Leone Banks are guided by Banking Act, BSL Act 2019, Companies Act and different prudential guidelines given by BSL. Liberalization as well as lifting exchange regulators in banking sector happened in 1995 (BSL, 2016). The BSL is under the docket of cabinet secretary in parliament and is vested with formulation and execution of monetary policy, encouraging solvency, liquidity and proper functioning of banking and financial sector (Otuori, 2013)). Central bank has the responsibility of publishing information on financial sector which is made up of banking as well as non-banking financial institutions. Sierra Leonean banking institutions are under Sierra Leone Association of Commercial Banks (SLACB), which is the body that protects various interests of banks while addressing other issues relating to the various members. In a country whereby banks denominate financial sector, shortcomings in these banks' operations or failures have compounding effect on country's economic growth (Sheefeni, 2015). In Sierra Leone, licensed commercial Banks are 14 in number (BSL, 2021).

1.3 Research Hypotheses

H_0: Prudential regulations have no significant effects on financial performance of commercial banks in Sierra Leone.
H_1: Prudential regulations have significant effects on financial performance of commercial banks in Sierra Leone.

2.0 LITERATURE REVIEW

2.1 Liquidity Regulation and Financial Performance.

A study by (Daboh, et al., 2020) assessed whether prudential measures like liquidity regulation influence banks' performance in Sierra Leone. Additionally, study's purpose was to look at how liquidity regulation influences banks' performance in Sierra Leone. Analysis included both descriptive and panel regression analysis, as well as the use of Eviews software. Liquidity regulation was noted to influence bank financial performance significantly. The moderator had insignificant impact on prudential regulations and bank performance, and its interaction with liquidity had no significant impact on ROE. The study, though conducted in Sierra Leone, did not consider the impact of foreign exchange regulation, which the current study did.

In Kenya, (Mwenda, 2018) assessed whether liquidity regulations influence microfinance institutions' financial performance. The study used descriptive study approach. Data analysis was done by employing descriptive and also inferential statistics. It discovered significant positive nexus between liquidity regulation and financial performance. Although this research was conducted in Kenya, it concentrated on Kenyan microfinance banks, whereas the present research focused on commercial banks in Sierra Leone.

A study by (Mohamed, et al., 2017) assessed liquidity management, as a measure of CBK prudential guidelines, and performance of commercial banks in Kenya. In addition, the researcher examined liquidity management on commercial banks' performance in Kenya. Furthermore, this research used a descriptive study approach. Findings indicated that commercial banks' performance is significantly affected by liquidity regulation. However, this study used primary data and analysis was done using SPSS and Eviews version 8. Nonetheless, secondary data was employed in the current research and both panel regression as well as descriptive analysis was deployed for data analysis.

A study by (Munywoki, 2017) examined effect of liquidity regulation by CBKs on NSE-listed commercial banks' financial performance. Descriptive statistics as well as panel data regression analysis were adopted for data analysis from 2012 to 2016. Liquidity regulation had significant positive association with listed banks performance as per the results obtained. The researcher focused on NSE-registered commercial banks whereas this research was carried out in all 14 licensed commercial banks in Sierra Leone hence contextual gap was addressed.

In Nigeria, (Ajibike & Aremu, 2015) investigated whether liquidity influences bank performance. Moreover, the study assessed whether bank liquidity influences its performance.

Additionally, the investigation focused on the GMM estimate techniques, which were tested on a panel of thirteen banks from 2004 to 2012. The outcomes of the study revealed an inverse and also significant link between net loans and bank performance. Hence, the study concluded that bank's liquidity is important in ascertaining its success hence they advised that banks need to increase their liquidity levels to guarantee improved performance. However, this study was performed in Nigeria but current research was performed in Sierra Leone thus, addressing contextual gap.

In Netherland, (Bonner, 2014) studied whether liquidity guidelines influences bank behavior. This research was carried out from 2008 to 2012. This study revealed that capital regulation was related to decreasing liquidity buffers. Due to the fact that liquidity and capital are costly for banks, this seems to be a potential cause for this impact. The other possible explanation was that through pressure of attaining capital adequacy, regulators and banks abandoned liquidity risks. Lastly, reducing liquidity buffers may moderately be caused by rational choices of banks. Even though liquidity risk is not addressed by capital alone, it increases banks' chances to finance themselves in the market. Nevertheless, financial crisis revealed that, independent of particular reasons, liquidity buffers of banks were very low. In addition, high levels of capital were not an alternative for buffers and prudent liquidity risk management.

The study was based in Netherlands but the on-going research study was on banks in Sierra Leone hence creating contextual gap.

2.2 Credit Risk Regulation and Financial Performance

In Uganda, (Mugo, 2020) investigated the impact of credit risk regulation on banks' financial performance. Moreover, analysis included both descriptive and panel regression analysis. Credit risk was shown to be a key determining factor of commercial banks' financial performance. The study revealed that prudential rules and financial performance were however not considerably influenced by the moderator, and its interaction with credit risk had no significant impact on ROE. The study though performed in Uganda, factored bank size as the moderator but the current study did not, also it did not assess impact of foreign exchange regulation which the current study has factored in.

In Sierra Leone, (Musabi & Morlai, 2018) examined whether credit facilities regulations influence the Performance of the 14 licensed Commercial banks in Sierra Leone from 2014 to 2018. Descriptive study design was used in all 14 Commercial banks and SPSS was deployed to analyse data. This research concluded that regulations of credit facilities significantly influenced commercial banks' financial performance.

Furthermore, the recommendation was that BSL ought to prohibit more costs on credit facilities by creating proper loan procedures and shortening the long cycle involved, whilst bank managers ought to invest in liquid assets as well as enhance credit policies to enhance financial performance. This research however did not consider the liquidity, capital adequacy and foreign exchange exposure variables which the current study has factored in.

In America, Munywoki (2017), did an investigation to test impact of credit risk regulation on NSE-listed banks' financial performance. In addition, data from eleven (11) listed Banks for a period between 2012 and 2016 was analyzed through panel data regression as well as descriptive statistics analysis. The study revealed that credit risk regulation had significant inverse association with financial performance. This research study focused on commercial banks registered at NSE whereas current study was performed on all commercial banks therefore addressing contextual gap.

In Ethiopia, (Gizaw, et al., 2015) did an empirical analysis to examine whether credit risk management influences commercial banks' profitability. The study emphasized on the year period between 2003 and 2014 as time scope. The findings reveal that banks' credit risk management in Ethiopia had improved over time as indicated by NPLs ratio. The conclusion was that CRM had significant positive link to banks profitability in Ethiopia. The research recommended that managers in the bank should apply current techniques of credit risk management so as to achieve improved performance. The study though of East Africa, however emphasized on Ethiopian banking sector while the current research was in Sierra Leone banking sector with varying economic conditions.

2.3 Capital Adequacy Regulation and Financial Performance

In Egypt, Mugo (2020) investigated whether capital adequacy regulation influences banks' financial performance. In addition, the study's purpose was to assess whether capital regulations influence Egyptian banks' financial performance. The analysis included both descriptive and panel regression analysis. The study revealed that capital adequacy regulation impacts bank performance significantly. The association between capital adequacy regulation and financial performance was not considerably influenced by the moderator, and its combination with liquidity had no meaningful impact on ROE. The study did not assess impact of foreign exchange regulation which the current study has factored in.

In Tanzania, (Lotto, 2018) assessed whether capital regulation requirements influence efficiency of banks. This investigation employed data on bank level for a period between the year 2009 and 2015. The study revealed that capital ratio influenced efficiency of bank operation positively and significantly, meaning commercial banks located in Tanzania with more stringent regulations on capital are more operational efficient. The study recommended that capital sufficiency reinforce financial stability through offering a greater capital cushion and also increasing efficiency in bank operation by eliminating a moral hazard difficulty between debt-holders and shareholders.

The study though of East Africa, however focused on Tanzania banking sector while the current research focused on Sierra Leone banking sector with varying economic conditions.

A study was done by (Alkadamani, 2018) which evaluated the nexus between impact of capital sufficiency, bank crisis and behaviour in developing economies. The study assessed 46 commercial banks from four countries in Middle East. The study established significant correlation between capital adequacy and bank returns. The study also found that, banks closer to least required capital increase their CA by raising capital as well as reducing risk investments. The study was focused on Middle East countries; therefore, these findings may not be generalized to Sierra Leone setting.

A study was done by (Mwega, 2016) on capital adequacy regulation and performance of the financial sector of Kenya. The study focused on linkages between regulation, profitability as well as stability of commercial banks. Empirical approach was employed in the study including analysis of focused policy and quantitative work. The study found significant link between capital regulation and bank profitability. Regulations according to the report have resulted to profitability increase. The study nevertheless did not assess whether foreign exchange exposure limit regulation influences commercial banks' performance.

3.0 METHODOLOGY

3.1 Research design

The study used explanatory research design which focuses on cause and effect relationships among variables (Cooper & Schindler, 2009).

3.2 Target Population

The target population consisted all 14 licensed commercial banks in Sierra Leone from 2002 to 2022.

3.3 Sampling frame

Sampling entails selecting or choosing subset or population constituent which can be utilized for purposes of generalization, (Field, 2005). Since the target population was slarge (14 licensed commercial banks), the study made use of a census approach and hence the whole population was used. Census approach eliminates sampling error and is suitable for large populations, and gives data on all observations within a population.

3.4 Sampling technique

A convenience sampling technique was implored to be able to access data from the most probably welcoming of the target population.

3.5 Empirical Model

Panel regression model was used. Measurement of the cross section of the same unit is done at different periods in panel regression, which brings together time series and also cross-section data. Data from a number of organizations observed constantly throughout time is known as panel data. A balanced data panel is that in which overall unit time is the similar for each respondent. Instead, if the time units differ for each individual, it is referred to as an unbalanced panel. The panel regression model was the most appropriate in this study because it involved 14 licensed commercial banks for a period of five years (2017 to 2021). The panel regression model was as follows;

$$ROA_{i_t} = \beta_0 + \beta_1 LIR_i + \beta_2 CRR_i + \beta_3 CAR_i + \epsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..3.1$$

Where:

ROA_i – Return on Assets

β_0 – Constant.

LIR_i – Liquidity Regulation.

CRR_i – Credit Risk Regulation.

CAR_i – Capital Adequacy Regulation.

$\beta_1 - \beta_4$ =Regression of coefficients.

ϵ_i = Error-term.

3.6 Operationalization and Measurement of Study Variable.

The sub-section provides various Operationalization as well as measurements utilized for the study variables.

Table 3. 1: Operationalization and Measurement of Variable

Variable	Category	Operationalization	Measurement	Measurement Scale	Expected outcome
Liquidity regulation	Independent Variable	Ability to meet short term obligations when due	Liquidity ratio: Total loan / Total deposit	Ratio	☐ Positive
Credit risk	Independent Variable	Guidelines relating to the asset quality of banks.	NPLs/ Total Loans	Ratio	☐ Negative

regulation					
Capital adequacy regulation	Independent Variable	Guidelines relating to capital of commercial banks.	CA ratio	Ratio	☐ Positive

3.7 Data Collection Procedure

This research implored secondary data obtained from several sources including audited commercial banks' financial statements as well as BSL supervisory reports. The data covered duration of twenty years between 2002 and 2022. The collection of data was guided by a data collection guide (as documented in Appendix II).

3.8 Data Analysis and Presentation

Data analysis involves transformation of data in research into usable and more understandable form for purposes of interpretation, making conclusions and recommendations. The research was centered on the multiple linear regression model. The use of mean, standard deviation, maximum, minimum and total number of observation was used during descriptive analysis.

3.9 Diagnostic Tests

Various diagnostic tests were undertaken. These include tests for normality, multicollinearity, heteroscedasticity, serial autocorrelation and as well as the stability of the model using the CUSUM and CUSUM of square.

3.9.1 Normality Test

Regression analysis data is expected to be normally distributed, for example normality test is performed to establish data distribution. Research data distribution was tested using Shapiro-Wilk W test which concur with Greene (2012). Moreover, this test is founded on null hypothesis for normal distribution and the non-normal distribution is an alternative hypothesis. In case p-value is lower than 5 percent then data obtained is not normally distributed and vice versa. Non-parametric test is considered in the case of research data which is not normally distributed.

3.9.2 Multicollinearity-Test

The circumstance where independent study variables in an investigation have certain degree of association is known as multicollinearity (Wooldridge, 2013). High multicollinearity levels results to inaccurate estimates since it raises p-values in a regression. In order to evaluate correlation level amidst predictor variables, the Variance Inflation Factor (VIF) was employed.

3.9.3 Heteroskedasticity Test

According to Verbeek (2012), heteroscedasticity is a scenario where residual variances have stable indifferent observations. In evaluating heteroscedasticity, Breusch Pagan Godfrey test was employed in the research study. P-value which is more than 5 % means that data is not suffering from heteroscedasticity and hence it is considered homoscedastic. In case of heteroscedasticity in the data set, the study made use of the Breucsh-Pagan Godfrey test.

4.0 RESULTS

4.1 Descriptive Statistics

4.1.1 Capital Adequacy Ratio

The total amount of capital a bank must have to meet regulatory requirements in a nation is known as capital adequacy. Banks with sufficient capital will generate liquidity for the institution, lowering the likelihood of financial distress. According to Pajutagana (1999), management should consider how market risk, credit risk, and other inherent risks would affect the bank's financial performance. Lad and Ghorpade (2022) have pointed out that the capital adequacy ratio has a big impact on how well a bank does economically. Banks with high capital adequacy ratios are better able to meet their obligations and are less likely to go bankrupt in times of crisis. The graph below presents the trend analysis in Capital Adequacy Ratio;

Fig 1: CAPITAL ADEQUACY RATIO

CAR
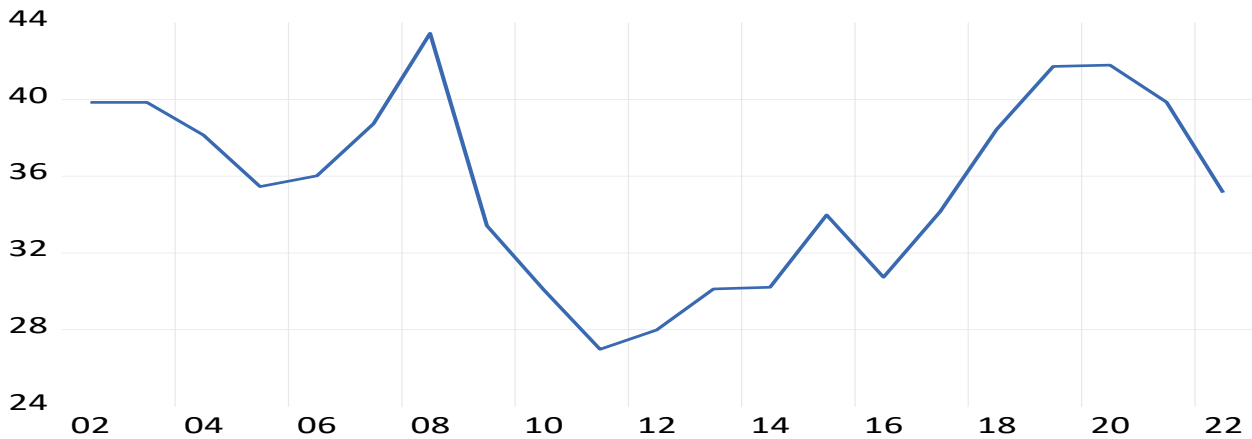
Source: Researchers calculations, 2023.

The trend analysis for the capital adequacy ratios in the Sierra Leonean economy is shown in the graph above. According to the data in the graph above, the regulatory capital ratio has been rising year over year, reaching a CAR of 41.7% and 41.3% in 2019 and 2021, respectively. However, throughout 2012, 2013, 2014, and 2016, it had a sharp decline, dropping to 27.7%, 30.1%, 30.2%, and 30.7%. Figure 1 above shows that the Ebola Outbreak and the decline in global commodity prices, such as those for iron ore and oil, may be responsible for the decline in 2014 and 2016. Due to the Corona Virus pandemic, the CAR substantially drops to 40.1% between 2019 and 2020. But in 2021, the economy once more recovered thanks to a rising CAR rate of 41.3%.

4.1.2 Liquidity Reserve Requirement

The ability of the bank to fulfill its obligations, primarily from depositors, is referred to as liquidity. The profitability of banks is favorably correlated with an adequate level of liquidity. Another definition of liquidity is the bank's capacity to promptly convert its liquid assets into cash when necessary or to settle its debt obligations as soon as they become due. Gul Zeb (2011). The graph below presents the trend analysis in liquidity ratio;

Fig 2: LIQUIDITY RESERVE REQUIREMENT

LRR
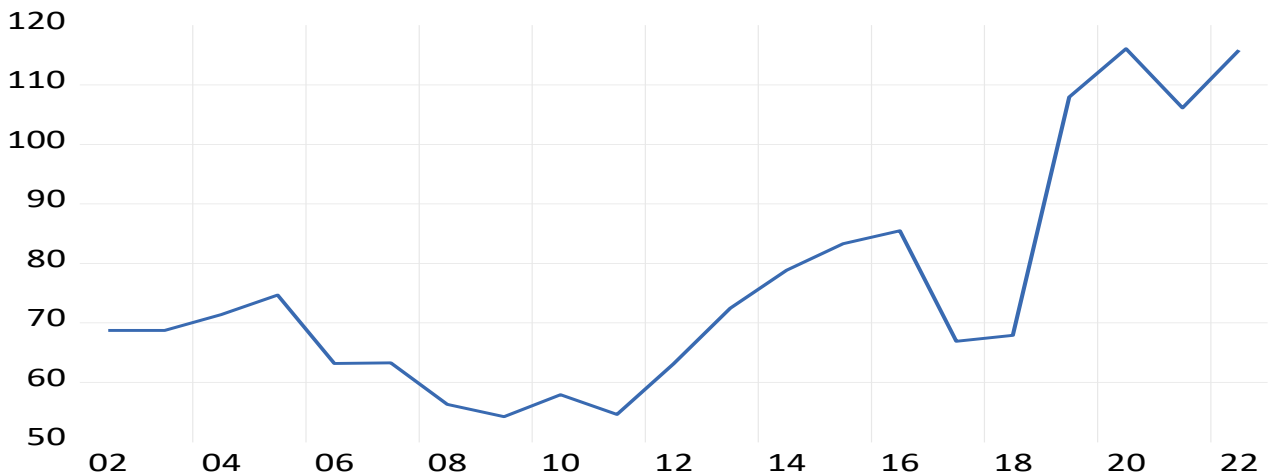
Source: Researchers calculations, 2023.

The graphs above show the banking industry's liquidity ratios in terms of liquidity ratio. The Liquidity Ratio for the banking sector in Sierra Leone is shown in the graphs below. The graph above provides evidence that the liquidity ratio has been rising on an annual basis, demonstrating the banking industry's capacity to fulfill its obligations as and when they emerge. It recorded the maximum liquidity in 2015 and 2016 with 83.3% and 85.5%, respectively. It had a sharp decline to 40.7% in 2012, however it still above the regulatory body's minimum threshold. While there has been a steady increase in the ratio of net loans to total deposits.

4.1.3 Non-Performing Loans

Asset quality, which is the specific aspect affecting banks' profitability, relates to the caliber of loans that the bank has made. The profitability of commercial banks is directly correlated with the asset quality of the bank. The Portfolio at

Risk and the Write-Off Policies are utilized as the quantitative indicators in determining the non-performing loans or the asset quality of the bank Khatri (2019), in accordance with the CAMEL rating methodology. A bank loan that is prone to late repayment or that the borrower is unlikely to repay in full is referred to as a non-performing loan (NPL). For the banking industry, non-performing loans pose a significant concern because they lower profitability. Although this argument is debatable, it is frequently asserted that they impede banks from lending more money to individuals and businesses, which in turn inhibits economic growth. The graph below presents the Non-performing loans within the Sierra Leone banking sector;

Fig 3: NON- PERFORMING LOANS

NPL
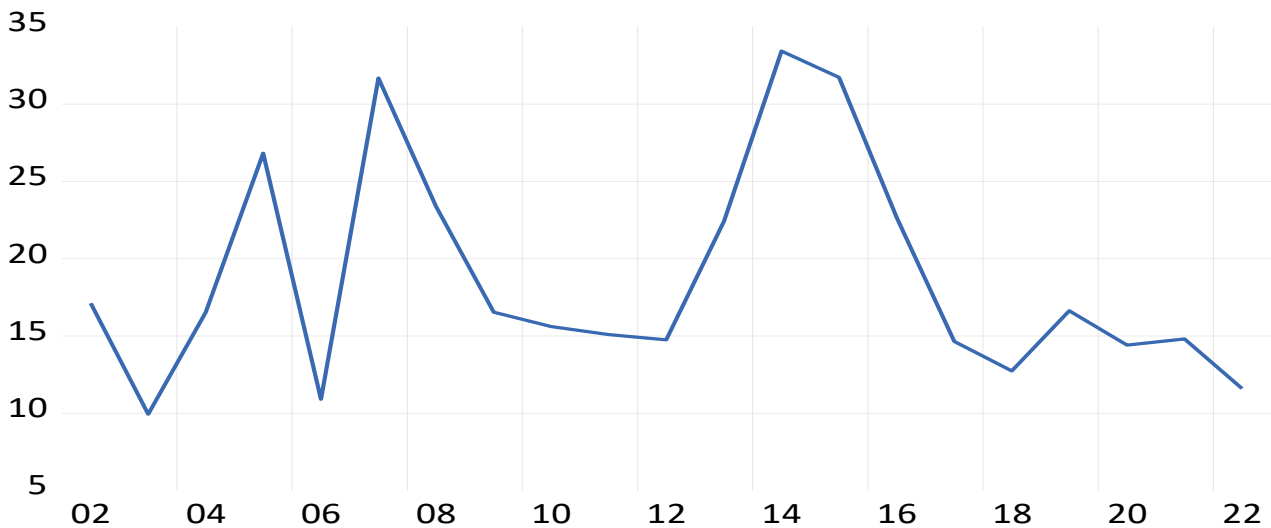
Source: Researchers calculations, 2023.

The asset quality of the banking industry is trended in the charts above. The asset quality of the banking industry in Sierra Leone is shown in Figure 3 below and includes both the ratio of NPLs to total gross loans and the ratio of NPLs (Net of Provisions) to regulatory capital. The ratio of non-performing loans to total gross loans has been steadily rising, reaching its greatest levels in 2014 and 2015 (33.4% and 31.7%, respectively), and somewhat declining in 2012, 2017 and 2018 (14.7%, 14.6%, and 12.7%, respectively). Despite the economic effects of the Corona Virus pandemic, we may see that the NPL to total gross ratio dramatically declines to 12.7% in 2020 from 16.8% in 2019. Thus, the Ebola epidemic and the decline in iron ore prices may have contributed to the NPL's growth in 2014 and 2015. Evidence from the Bank of Sierra Leone's Financial Stability Report further supports the claim that the government's tardiness in paying contractors inside the domestic economy was to blame for the rise in non-performing loans.

4.1.4 Returns on Assets

A financial ratio known as return on assets (ROA) measures a company's profitability in relation to its total assets. ROA can be used by corporate management, analysts, and investors to assess how effectively a company uses its resources to make a profit. The metric is frequently represented as a percentage using the net income and average assets of a corporation. A company's ability to manage its balance sheet to produce profits is more effective and efficient when its ROA is higher; on the other hand, a lower ROA suggests there is potential for improvement.

The graph below presents the Returns on Assets in the banking sector

Fig 4: RETURN ON ASSETS

ROA
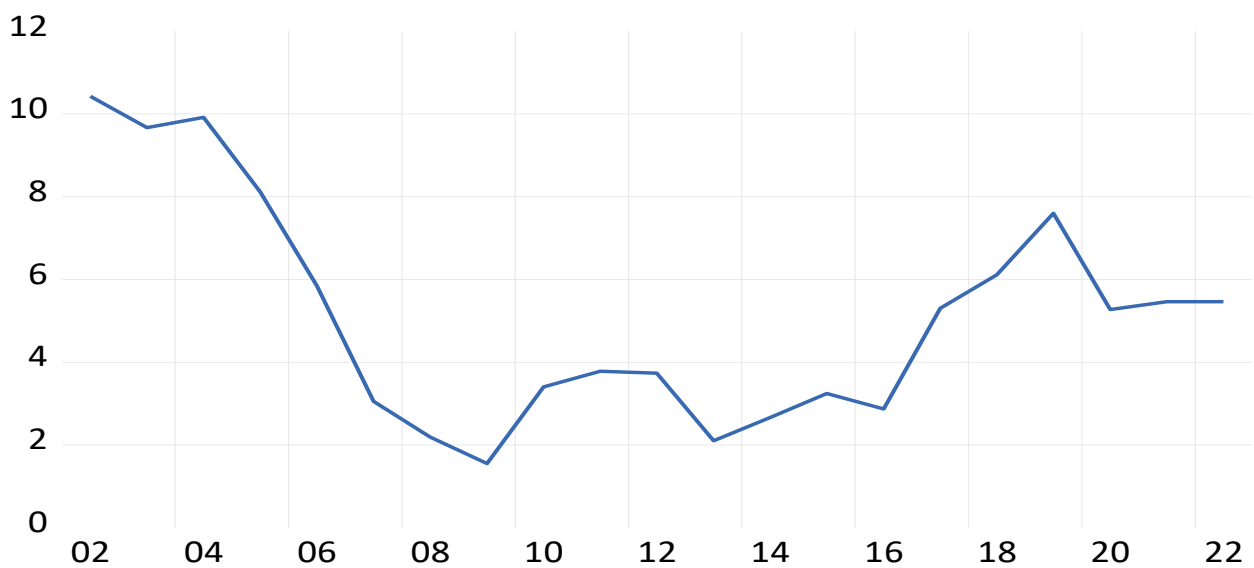
Source: Researchers calculations, 2023.

The banking industry's ability to generate income in terms of Returns on Assets is shown in the graphs. According to the results of the graphs, the banking industry in Sierra Leone has seen an increase in ROA every year, which demonstrates how sound the industry is. The ROA has been varying more frequently lately. The greatest ROA values were achieved between 2016 and 2020, with an annualized rate of 6.1%.
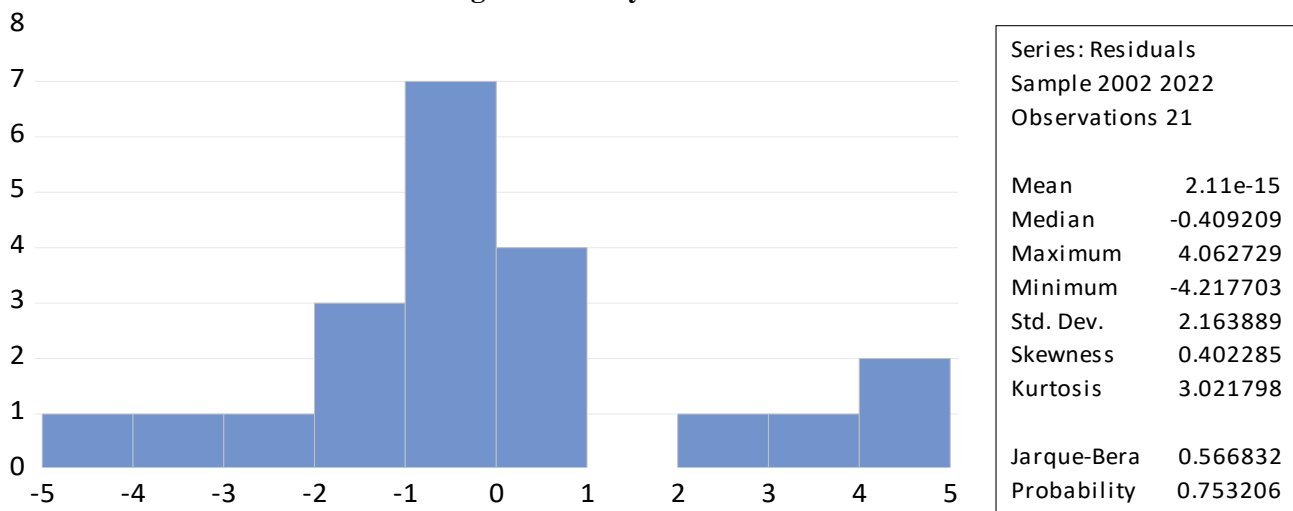
4.2 Descriptive Statistics
The table below presents the descriptive statistics for the Sierra Leone banking sector

Table 1: Jarque – Beta Statistics

	ROA	CAR	LRR	NPL
Mean	5.130952	35.52952	76.05476	18.73286
Median	5.270000	35.46000	68.74000	16.52000
Maximum	10.43000	43.45000	116.0900	33.44000
Minimum	1.550000	26.97000	54.22000	9.940000
Std. Dev.	2.692033	4.856173	19.62806	7.077064
Skewness	0.638851	-0.158704	0.986201	0.891181
Kurtosis	2.291052	1.881579	2.738210	2.591175
Jarque-Bera	1.868239	1.182662	3.464039	2.925955
Probability	0.392932	0.553590	0.176927	0.231546
Sum	107.7500	746.1200	1597.150	393.3900
Sum Sq. Dev.	144.9408	471.6483	7705.211	1001.697
Observations	21	21	21	21

Source: Researchers calculations, 2023.

Table 4.1 above contrasts the alternative of non-normality to the null hypothesis of normality using Jarque-Bera statistics based on the aforementioned table. The P-values for all of the aforementioned variables included in the study are all larger than 5% (0.05), indicating that the Jarque-Bera values are significant at all levels of significance. As a result, the null hypothesis has been accepted, and it has been determined that, all the variables employed in this study are normally distributed and thus suitable for further analysis.

Fig 4 Normality Distribution Test

Series: Residuals	
Sample 2002 2022	
Observations 21	
Mean	2.11e-15
Median	-0.409209
Maximum	4.062729
Minimum	-4.217703
Std. Dev.	2.163889
Skewness	0.402285
Kurtosis	3.021798
Jarque-Bera	0.566832
Probability	0.753206

Source: Researchers calculations, 2023.

4.3 Multiple Linear Regression Model

The table below presents the regression output using the Least squares method

Table 2: Regression Output Using Least Squares

Dependent Variable: ROA
Method: Least Squares
Date: 07/08/23   Time: 14:46
Sample: 2002 2022
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.241768	0.115717	2.089304	0.0520
LRR	0.001598	0.028453	0.056170	0.9559
NPL	-0.130251	0.074976	-1.737235	0.1004
C	-1.140536	4.421612	-0.257946	0.7995

R-squared	0.353886	Mean dependent var		5.130952
Adjusted R-squared	0.239866	S.D. dependent var		2.692033
S.E. of regression	2.347067	Akaike info criterion		4.713853
Sum squared resid	93.64829	Schwarz criterion		4.912810
Log likelihood	-45.49546	Hannan-Quinn criter.		4.757032
F-statistic	3.103714	Durbin-Watson stat		0.636777
Prob(F-statistic)	0.054298			

Source: Researchers calculations, 2023.

According to Table 2, the estimated relationship between the Capital Adequacy Ratio (CAR) and Returns on Assets (ROA) is positive with a coefficient of 0.241768 and statistically significant at 5% with a P-Value of (0.0520). Indicating that the ROA is anticipated to improve at a rate of 0.241768 for every increase in the capital adequacy ratio. Additionally, Non-performing loans (NPL) is statistically insignificant at the 5% Probability level with a P-Value of 0.1004 and has a negative coefficient of -0.130251 on the Returns on Assets. Indicating that the ROA is anticipated to drop at a rate of -0.13251 for every increase in Non-performing loans. Finally, Liquidity Reserve Ratio (LRR) is having a positive coefficient of 0.001598 and have and insignificant relationship to the Returns on Assets (ROA) with a P-Value of (0.9559). Thus, implying that an increase in the Liquidity Reserve Ratio (LRR) would lead to a proportionate increase in the Returns on Assets in the banking sector.

According to the table above, $R^2 = 0.353886$ means that CAR, LLR and NPL accounted for 35% of the changes or variations in ROA for the year's study, leaving random error to account for the remaining 65%, which may be the consequence of additional factors not taken into consideration in this study.

4.4 Tests for Autocorrelation

The table below presents the autocorrelation test using the Breusch-Godfrey Serial Correlation LM test

Table 3: Autocorrelation Test Using Breusch- Godfrey Serial Correlation LM test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	4.458373	Prob. F(2,15)	0.0302
Obs*R-squared	7.829312	Prob. Chi-Square(2)	0.0199

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 07/08/23   Time: 14:48
Sample: 2002 2022
Included observations: 21
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	-0.059663	0.109058	-0.547077	0.5924
LRR	0.005003	0.024299	0.205886	0.8396
NPL	0.012093	0.068352	0.176920	0.8619
C	1.498979	4.158366	0.360473	0.7235
RESID(-1)	0.651954	0.263112	2.477858	0.0256
RESID(-2)	-0.044691	0.294933	-0.151528	0.8816

R-squared	0.372824	Mean dependent var	2.11E-15
Adjusted R-squared	0.163766	S.D. dependent var	2.163889
S.E. of regression	1.978786	Akaike info criterion	4.437801
Sum squared resid	58.73392	Schwarz criterion	4.736236
Log likelihood	-40.59691	Hannan-Quinn criter.	4.502569
F-statistic	1.783349	Durbin-Watson stat	1.636415
Prob(F-statistic)	0.176864		

Source: Researchers calculations, 2023.

The study does not reject Ho and concluded that there is serial correlation in the data because the critical Chi square value for the observed R-square value is less than 0.05.

4.5 Heteroscedasticity Test

The table below presents the heteroskedasticity test using the Breusch-Pagan-Godfrey Test

Table 5: Heteroscedasticity Test Using Breusch- Pagan- Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	3.578253	Prob. F(3,17)	0.0359
Obs*R-squared	8.128066	Prob. Chi-Square(3)	0.0434
Scaled explained SS	5.384609	Prob. Chi-Square(3)	0.1457

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 07/08/23   Time: 14:47
Sample: 2002 2022
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-15.38565	10.39446	-1.480178	0.1571
CAR	0.808243	0.272031	2.971142	0.0086
LRR	-0.147649	0.066888	-2.207411	0.0413
NPL	0.125873	0.176256	0.714150	0.4848

R-squared	0.387051	Mean dependent var	4.459442
Adjusted R-squared	0.278883	S.D. dependent var	6.497467
S.E. of regression	5.517557	Akaike info criterion	6.423391
Sum squared resid	517.5384	Schwarz criterion	6.622347
Log likelihood	-63.44560	Hannan-Quinn criter.	6.466569
F-statistic	3.578253	Durbin-Watson stat	1.615414
Prob(F-statistic)	0.035912		

Source: Researchers calculations, 2023.
The study accept Ho and get to the conclusion that there is no heteroscedasticity in the error variances—that is, the disturbance terms are homoscedastic in nature—because the critical Chi square-value for the observed R-square value is greater than 0.05.

4.6 Stability Diagnostic
The graph below presents the stability diagnostic test using the CUSUM and CUSUM of Squares.

Fig 4: Stability Diagnostic Test
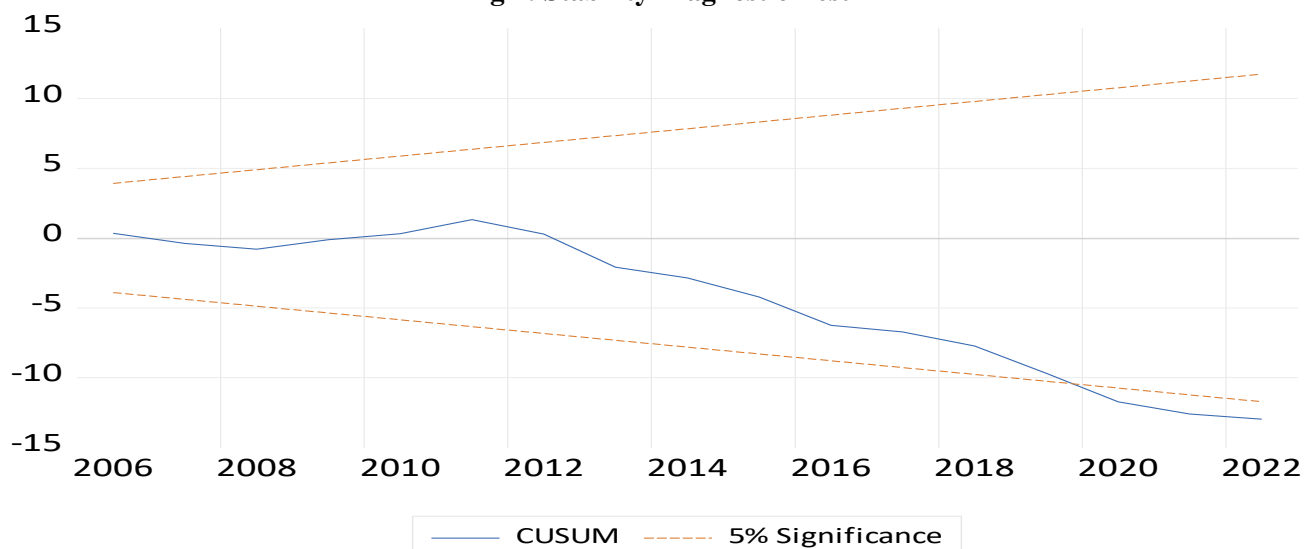
The results of the estimated CUSUM tests indicate that the parameters used in this study (specifically Returns on Assets) are highly unstable. Specifically, the plots of CUSUM fell outside the 5% critical bounds, providing further

evidence of the instability of the parameters. Thus, this instability occurs during the period of 2020 which may be as result of the corona virus pandemic.

4.7 Hypothesis Testing

4.7.1 Liquidity regulation has no significant effect on financial performance of commercial banks in Sierra Leone.

The result from the regression analysis revealed that Liquidity Reserve Ratio (LRR) is having a positive coefficient of 0.001598 and have an insignificant relationship to the Returns on Assets (ROA) with a P-Value of (0.9559). The null hypothesis is accepted and concluded that liquidity regulation has no significant effect on financial performance of Commercial Banks in Sierra Leone. The study further concludes that a unit increase in the liquidity ratio would lead to a proportionate increase in the Returns on Assets (ROA) by 0.002 times.

4.7.2 Credit risk regulation has no significant effect on financial performance of commercial banks in Sierra Leone

The study also shows that Non-performing loans (NPL) is statistically insignificant at the 5% Probability level with a P-Value of 0.1004 and has a negative coefficient of -0.130251 on the Returns on Assets. The null hypothesis is also accepted in this study and concludes that Credit risk regulation has no significant effect on financial performance of Commercial Banks in Sierra Leone. Thus, indicating that the ROA is anticipated to drop at a rate of -0.13251 for every increase in Non-performing loans.

4.7.3 Capital adequacy regulation has no significant effect on financial performance of commercial banks in Sierra Leone

The study further revealed that there exists a positive relationship between Capital Adequacy Ratio (CAR) and Returns on Assets (ROA) with a coefficient of 0.241768 and statistically significant at 5% with a P-Value of (0.0520). The null hypothesis therefore rejected and concludes Capital adequacy regulation has significant effect on financial performance of Commercial Banks in Sierra Leone. The study further Indicate that the ROA is anticipated to improve at a rate of 0.241768 for every increase in the capital adequacy ratio.

5.0 CONCLUSION

The Central Bank of Sierra Leone regulates the operations of the Commercial Banks through the Monetary Policy it establishes and implements and thus provide prudential guidelines to help enhance bank`s performance within the domestic economy. The Central Bank's monetary policy is often what determines the financial performance of Commercial Banks; any modifications to these tools could have either a good or negative impact on their performance.

The study sought to examine the influence of liquidity regulation on financial performance of Commercial Banks in Sierra Leone. The study`s findings revealed that Liquidity Reserve Ratio (LRR) is having a positive coefficient of 0.001598 and have an insignificant relationship to the Returns on Assets (ROA) with a P-Value of (0.9559). The study concludes that liquidity reserve ratio have a positive and insignificant effect on bank`s performance in Sierra Leone. Implying that a unit increase in the liquidity ratio would lead to a proportionate increase in the Returns on Assets (ROA).

In addition, the study seeks to assess the influence of credit risk regulation on financial performance of Commercial Banks in Sierra Leone. The study`s findings also shows that Non-performing loans (NPL) is statistically insignificant at the 5% Probability level with a P-Value of 0.1004 and has a negative coefficient of -0.130251 on the Returns on Assets. The study therefore, concludes that Non-performing loans have a negative and insignificant effect on bank`s performance in Sierra Leone. Indicating that an increase in the Non-performing loans would have an adverse effect on the financial performance of commercial banks in Sierra Leone.

Finally, the study sought to evaluate the influence of capital adequacy regulation on financial performance of Commercial Banks in Sierra Leone. The findings further revealed that there exists a positive relationship between Capital Adequacy Ratio (CAR) and Returns on Assets (ROA) with a coefficient of 0.241768 and statistically significant at 5% with a P-Value of (0.0520). The study therefore, concludes that capital adequacy regulation have a positive and significant effect on bank`s performance in Sierra Leone. Implying that an increase in the CAR would proportionately lead to an increase on the financial performance of commercial banks within the domestic economy in terms of its Returns on Assets (ROA).

REFERENCES:
1. Ahmed, L., 2015. The effect of foreign exchange exposure on the financial performance of commercial banks in Kenya. *International journal of scientific and research publications,* 5(11), pp. 115-120.
2. Ajibike, J. O. & Aremu, O. S., 2015. The impact of liquidity on Nigerian bank performance: A dynamic panel approach. *Journal of African Macroeconomic Review,* 5(2), pp. 23-41. .

3. Akani, H., Mbachu, W. & Nwanna, L., 2016. Effects of selected macroeconomic variables on commercial banks performance in Nigeria. *IIARD International Journal of Banking and Finance,* 2(3), pp. 34-75.
4. Alemu., K., 2015. Determinants of financial performance of commercial banks in Ethiopia. *Journal of Business Management and Economics,* 3(11), pp. 33-40.
5. Alkadamani, K., 2018. Capital adequacy bank behavior and crisis Evidence from emergent economies. *European Journal of Sustainable Development,* 4(2), pp. 329-329.
6. Allen, F. & Gale, E., 2014. Money, financial stability and efficiency. *Journal of Economic Theory,* 1(1), pp. 100-127.
7. Athanasoglou, P. P., Brissimis, S. N. & Delis, M., 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money,* 2(18), pp. 121-136..
8. Baye, C., 2010. Banks Performance in Uganda. *Journal of Business Research.*
9. Berger, A. N., 1995. The relationship between capital and earnings in banking. *Journal of money, credit and Banking,* 1(3), pp. 1-7.
10. Bhagwati, J., 1965. The pure theory of international trade: A survey. *Surveys of economic theory,* pp. 156-239. .
11. Bonner, C., 2014. Liquidity regulation and bank behavior. *CentER Tilburg University.*
12. BSL, 2002. *Bank supervision Annual Report ,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report..
13. BSL, 2008. *Bank supervision Annual Report ,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report..
14. BSL, 2011. *Bank supervision Annual Report 2016,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report..
15. BSL, 2015. *Bank supervision Annual Report ,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report. .
16. BSL, 2017. *Bank supervision Annual Report 2018,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report..
17. BSL, 2019. *Bank supervision Annual Report ,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report. .
18. BSL, 2021. *Bank supervision Annual Report ,* Freetown: https://centralbank.go.ke/index.php/bank-supervision-report..
19. BSL, 2022. *Financial services sector development report,* Freetown: https://centralbank.go.sl/index.php/bank-supervision-report..
20. Copper, D. & Schindler, P., 1995. *Business Research Methods,* New Delhi:: McGravv Hill.
21. Daboh, F., Bah, A. & Jalloh, A., 2020. Effectiveness of Monetary Policy on the Performance of Commercial Banks in Sierra Leone. *Journal of Administrative Management,* 2(132).
22. Edem, D., 2017. Liquidity management and performance of deposit money banks in Nigeria. *International Journal of Economics, Finance and Management Sciences,* 5(3), pp. 146-161.
23. Flamini, V., McDanald, C. & Schumacher, A., 2009. The determinants of commercial bank profitability in Sub-Saharan Africa.. *African journal of business management,* 2(9), pp. 59-66.
24. Gizaw, M., Kebede, M. & Selvaraj, S., 2015. The impact of credit risk on profitability performance of commercial banks in Ethiopia. *African journal of business management,* 9(2), pp. 59-66. .
25. Gul, S., Irshad, F. & Zaman, K., 2011. Factors Affecting Bank Profitability in Pakistan. *Romanian Economic Journal,* 14(39), pp. 90-112 .
26. Jensen, M. & Meckling, W. H., 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics,* 4(3), pp. 305-360..
27. Jonathan, M., 2012. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics,* 3(4), pp. 305-360.
28. Khrawish, A. & Al-Sa'di, M., 2011. The impact of e-banking on bank profitability: Evidence from Jordan. *Middle Eastern Finance and Economics,* 13(1), pp. 142-158. .
29. KPMG, 2007. *Financial services institutions development,* Freetown: s.n.
30. Lotto, J., 2018. The empirical analysis of the impact of bank capital regulations on operating efficiency. *International Journal of Financial Studies,* 6(2), p. 34.
31. Macharia, E., 2013. The effects of global financial crisis on the financial performance of commercial banks offering mortgage finance in Kenya. *International Journal of social sciences and entrepreneurship,* 1(2), pp. 688-701.
32. Milne, A. & Whalley, A., 2001. Bank capital regulation and incentives for risktaking. *Cass Business School Research Paper,* p. 17.

33. Mohamed, S., Mutegi, D. & Muriuki, M., 2017. Effect of the Central Bank of Uganda Prudential Guidelines on the Performance of Commercial Banks in Uganda. *Journal of Interdisciplinary Research,* pp. 613-626.

34. Mohamed, S., Mutegi, D. & Muriuki, M., 2017. Effects of the Central Bank of Kenya Prudential Guidelines on the Performance of Commercial Banks in Kenya. *Imperial Journal of Interdisciplinary Research (IJIR),* 3(9), pp. 613-626. .

35. Mugo, P., 2020. rudential regulations and financial performance of commercial banks in Uganda. *Unpublished MBA Thesis Kaikia University.*

36. Mulwa, G., 2015. The effect of monetary policy on the financial performance of commercial Banks in Kenya. *Doctoral dissertation, University of Nairobi.*

37. Munywoki, A., 2017. Effect Of Central Bank Of Kenya Regulations On The Financial Performance Of Commercial Banks Listed At The Nairobi Securities Exchange In Kenya. *Doctoral dissertation Kca University.*

38. Musabi, A. & Morlai, M., 2018. Influence of prudential regulations on financial performance of commercial banks in Tanzania. *The Strategic Journal of Business and Change Management,* 5(4), pp. 90-1176.

39. Mwega, F. M., 2016. Financial regulation in Kenya: Balancing inclusive growth with financial stability In Achieving Financial Stability and Growth in Africa. *An International Journal,* pp. 99-122.

40. Mwenda., L., 2018. Effect of Prudential Regulations on Financial Performance of Microfinance Banks in Kenya .. *Doctoral dissertation University of Nairobi.*

41. Mwenda, L., 2018. Effect of Prudential Regulations on Financial Performance of Microfinance Banks in Kenya. *Doctoral dissertation University of Nairobi.*

42. Odhiambo, O. & Makori, D., 2019. Financial Risk And Financial Performance Of Commercial Banks In Kenya. *International Journal of Scientific and Education Research,* 3(4), pp. 1-15.

43. Odhiambo, O. & Mokori, D., 2019. Financial Risk And Financial Performance Of Commercial Banks In Kenya. *International Journal of Scientific and Education Research,* 3(4), pp. 1-15.

44. Okoth.V, 2013. Determinants of Financial Performance of Commercial Banks. *International Journal of Economics,* 2(1), p. 89.

45. Olweny, T. & Shipho, T. M., 2011. Effects of banking sectoral factors on the profitability of commercial banks in Kenya. *Economics and Finance Review,* 1(5), pp. 1-30. .

46. Ongore, V. & Kusa, G., 2013. Determinants of financial performance of commercial banks in Kenya. *International journal of economics and financial issues,* 1(3), p. 3.

47. Ongore, V. & Kusa, G., 2013. Determinants of financial performance of commercial banks in Kenya. *International journal of economics and financial issues,* 3(1), p. 21.

48. Otuori, H., 2013. Influence of exchange rate determinants on the performance of commercial banks in Kenya. *European Journal of management sciences and economics,* 1(2), pp. 86-98 .

49. Ruziqa, A., 2013. The impact of credit and liquidity risk on bank financial performance: the case of Indonesian Conventional Bank with total asset above 10 trillion Rupiah. *International Journal of Economic Policy in Emerging Economies,* 6(2), pp. 93-106.

50. Sangmi, M. & Nazir, T., 2010. Analyzing financial performance of commercial banks in India: Application of CAMEL model. *Pakistan Journal of Commerce and Social Sciences (PJCSS),* 4(1), pp. 40-55. .

51. Sheefeni, J., 2015. The macroeconomic determinants of profitability among commercial banks in Namibia. *The macroeconomic determinants of profitability amongJournal of Emerging Issues in Economics, Finance and Banking,* 4(1), pp. 1414-1431.

52. Svensson, L., 2018. Monetary policy and macroprudential policy: Different and separate?.. *Canadian Journal of Economics,* 13(51), pp. 802-827 .

53. Thatcher, M., 2002. Delegation to independent regulatory agencies: Pressures, functions and contextual mediation.. *West European Politics,* 1(25), pp. 125-147.

54. Trivedi, S., 2010. An analysis of financial performance of state road transport corporation in Gujarat. *Doctoral dissertation, Saurashtra University.*

55. Ueda, K. & F.Valencia, 2014. Central bank independence and macro-prudential regulation.. *Economics Letters,* 125(2), pp. 327-330.

56. United Bank for Africa, 2021. Historical Development of United Bank for Africa. December.

57. Wanjiru, M., 2012. Effect of financial regulation on Financial Performance of DepositTaking Microfinance institutions in Kenya. *Doctoral dissertation.*

58. World Bank, 2017. *World development report 2017: Governance and the law,* Washington DC: The World Bank.