Commercial Banks’ Performance and Credit Risk in Sierra Leone: Panel Evidence

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Abstract

The performance of the banking sector for most Sub-Saharan African Countries in the 1990s was mixed and witnessed low level of capital for investment, leading to severe constraints on resources used for development of the sector. This scenario was the case for Sierra Leone, the performance of the banking sector in the 1990s and mid 2000s was relatively poor and partly blamed to inadequate banking supervision, poor coordination, inadequate payment infrastructure and subjective assessments of credit creation across banks leading to high volume of non-performing loans and liquidity problem. Given the devastating effects of credit risk of default on banks performance and growth, we investigate banking performance and credit risk in Sierra Leone from 1997-2011, using Panel Least Square regression approach. This study reveals that non-performing loans, loan loss provision and the quality of total loans were contributing factors for the poor performance of banks in Sierra Leone. However, bank size and interest rates spread impact positively at a very small margin on profitability with an average Return on Assets (ROA) of 0.025% far below the 2% Return on Assets for Sub-Saharan Africa. The hypothesis that positive correlation exists between banks performance and prudent credit risk management is supported. The result also shows that banks performance and effect on credit risk are similar across banks in Sierra Leone (cross- section invariant). This study contributes to current literature by providing an econometric understanding of relationship between banking sector performance and credit risk in Sub-Saharan Africa. This understanding is important for academics and policy makers in shaping the future stability of the banking sector.

Keywords: Credit Risk, Banks’ Performance, Correlation, Panel Evidence Regression and Sierra Leone.

1. Introduction

Banking sector performance and its implication on credit risk is a controversial topic because we are most concern about poor banking performance that can lead to bank failure and crisis in the financial sector and thus have a negative effect on the economic growth. This research does not undermine banking failure and the devastation it may cause on the financial sector and the overall growth climate. We
have seen recently the world witnessed one of the most devastating financial meltdowns of 2007-2009 since the great depression of the 1930s. The most affected sector was the financial services industry, particularly the banking sector and became a regular target for tougher regulation, public anger and academic critics, and one factor that received considerable attention is risk management discourse.

However, among the risks faced by banks credit risk plays a crucial role on banks performance since huge amount of banks revenue are from credit as a result of interest charged on credit. It is important to note that, interest rate charged is directly correlated with credit risk; high interest rate may increase the chances of credit default. However, studies on banks performance and its implications on credit risk in the financial sector are rare; examples of some of the studies include the financial turmoil of 2007-2009, the economic and financial crisis of Vietnam and the banking and financial crises in Asia largely on account of non-performing loans and forced several banks in Indonesia and Thailand to close operation (Ahmed and Ariff (2007). The performance of the banking sector can be affected by internal and external factors, characterized by bank specific factors (management, board and ownership etc) and macroeconomic factors (Inflation, Real Gross Domestic Product etc). Banks play a pivotal role as depositories and often provide the main financial instrument for household wealth and are the major financial intermediaries in developing countries. (Gelb, 1989). This implies that maintaining confidence in the banking sector is important for avoiding a disruption of the financial sector and hence economic growth.

Much of the existing literature on banks profitability and its implication on credit risk management attribute greater importance to the rate of physical capital accumulation in the process of economic growth; the rate of capital accumulation in the banking sector depends upon the control of quality, quantity and efficiency of its credit risk management. Therefore the very nature of banking business is so sensitive because credit creation process exposes banks to high default risk and thereby affecting its liquidity and general operation that might lead to financial distress including bankruptcy (Saunders and Cornett, 2006). Credit risk is the exposure faced by banks when a borrower (customer) default in honoring debt obligations on due date at maturity (Coyle, 2000). To this end, the need for credit risk management in the banking sector is inherent in the nature of banking business.

It is important to note that the instability of the banking sector offer important theoretical insights and policy recommendation that are particularly valuable in areas of the world suffering from banking and financial crisis and low level of domestic mobilization of capital for investment and economic growth. Consistent with this notion, conventional wisdom suggest that no region in the world requires insights on building a safe, sound and banking system and promote financial sector development and economic growth more than Sub-Saharan African Countries that have witnessed low level of capital accumulation due to limited level of capital inflows, declining export receipt due to deteriorating terms of trade and mounting
external debt leading to severe constraints on resources used for development of the banking sector and suffered tremendously from difficulty of maintaining financial system stability and economic growth. However, in the last decade studies have shown that commercial banks in Sub-Saharan Africa (SSA) are more profitable than the rest of the world with an average Return on Assets (ROA) of 2% (Flamimi, et. al, 2009), one of the major reasons behind the high return in the region was that SSA banks are few compared to the demand for services as a result there is less competition and banks charge high interest rate on loan and gives out low interest rate on deposits, and therefore high interest rate spread. However, this situation is incredibly a risky venture and should be taken with caution.

These scenarios were the case for Sierra Leone, the performance of Sierra Leone’s banking sector in the 1990s and mid 2000s was poor and partly blamed to inadequate bank supervision, weak coordination among banks, inadequate payment system infrastructure and the subjective assessments of credit creation not consistent across banks and leading to high volume of non-performing loans and liquidity problem and impacts negatively on the banking industry, it is the case that Pro-Credit Bank-a foreign owned bank ceased operations in 2010 due to high volume of non-performing loans and consequently faced with liquidity problem. (Financial Sector Development Plan, 2009).

To address these problems, the Bank of Sierra Leone and the Banking Acts were revised in 2010, to provide sound legal framework for the banking system consistent with a more Independent Central Bank and effective banking supervision adhering to prudential soundness financial indicators. These measures resulted to good overall financial performance of the banking industry in the country. Despite the progress made thus far in the sector, there are couples of banks that reported losses; the sector is still faced with systematic and institutional inefficiencies, these have contributed to the high cost of financial intermediation, the unavailability of financing productive investment especially for small and medium enterprises, the high volume of non-performing loans, inappropriate loan loss provisioning, cash and overall liquidity deficiency, inadequate judicial procedures for loan recovery and inadequate credit risk management evaluation mechanism for bank clients. (Bank of Sierra Leone Annual Report, 2011)

Now that growth promotion in the banking sector is being actively supported by the International Monetary Fund (IMF), the World Bank and other International Financial Institutions (IFS) including the Government, all these efforts requires research to find out the link between banks performance and credit risk impacts on the
banking industry in Sierra Leone.

Given the abysmal and unfavourable performance of the banking sector in Sierra Leone since 1990s to mid 2000s, such as poor asset quality, non-performing loans and liquidity constraints even with the introduction of the IMF and the World Bank adjustment programmes coupled with the current banking failures in developed countries and the bailouts in 2007-2009, we ask the question; what are the determinants of banks performance and its implication on credit risk in Sierra Leone? Specifically, we seek to address the following sub-questions (i) Is there any correlation between banks performance and credit risk in Sierra Leone? (ii) Can growth policy design useful for the stability of the banking sector in terms of increased productive investments and hence economic growth? These therefore motivate the study and we propose the following hypotheses that can be tested.

\textbf{H}_1: \text{Banks performance and its effect on credit risk are similar across banks (cross-section invariant) in Sierra Leone}

\textbf{H}_2: \text{Banks performance correlates positively with prudent credit risk management}

Therefore, the purpose of this paper is to investigate empirically key determinants of bank’s performance and its implication on credit risk in Sierra Leone from 1997-2011 within the framework of panel least squares (PLS) regression estimate which offers the advantage of combining time series and cross section dimension of the data, with the common constant effect and the fixed effect (cross sectional specific) estimates to determine the first hypothesis (Green, 1993). The correlation matrices is applied to determine the second hypothesis and to also detect the existence of multi-collinearity among the explanatory variables.

Due to data incompleteness, of the 13 Commercial Banks in Sierra Leone, a cluster sample of four (4) banks is selected. These include the Rokel Commercial Bank (RCB), Sierra Leone Commercial Bank (SLCB), Union Trust Bank limited (UTB) and Standard Chartered Bank (SCB). Additionally, the justification for selecting these banks span from the fact that, they were rated by Bank Scope, an internationally recognized data base covering over 27,600 banks worldwide and also by the Bank of Sierra Leone as the top most four commercial banks in Sierra Leone as at December, 2011 with large customer base. As at December, 2011 the total deposit (local and foreign) was approximately Leones 2.2 trillion out of which the four (4), selected banks accounted for equivalently Leones 1.4 trillion constituting 58.3% of deposits liabilities and have been in existence since 1996 to date. (Bank of Sierra Leone Annual Report, 2012 p.37: Bank Scope Data Base, 2011).

The rest of the other banks in the country started operation in mid 2000s and coupled with data problem (short data) are therefore excluded in the study. Data on the determinants of Banks performance were collected from Bank scope data base (2011). An investigation in to these issues will help provide guidelines for banks performance and credit risk in order to enhance the quality of banks risk assets and can also be used to design policy for strengthening the banking industry and promote investment in
productive sectors and hence economic growth. This study contributes to the current literature in the following ways.

This study is the first in the context of Sierra Leone to assess key determinants of bank’s performance and credit risk. Second, studies on the effect of bank size on profitability are scant; this study incorporates the natural logarithm of assets (ln assets) to capture the effect of bank size in relation to risk diversification and return on assets. Third, the study account for the effect of the difference between interest rates on loan and interest rates on deposit (Interest Rates Spread) on profitability. Fourth, it contributes to the literature by providing an econometric relationship of Banks’ performance and implication on credit risk management in Sierra Leone, this understanding is important for academics and policy makers in shaping the future stability of the banking sector in Sub Saharan Africa and globally. Primary weakness of the study is the limited availability of the data. Analysis is therefore restricted to a smaller number of variables than desired because of these restrictions. However, sufficient data is available for the purpose of this research. The rest of this paper is organized as follows: section 2, is the literature review, section 3, methodology and data, section 4, the empirical results and discussions and finally, section 5 is the conclusion.

2. Literature Review

This section reviews theory and empirical literature in the context of developing and developed countries and to review a broader literature strand on the connection between Banks performance and credit risk. The connection between banks performance and credit risk is very crucial and important in the understanding of carrying out an empirical analysis on banks performance and its implication on credit risk.

It is hard to predict risk but it is necessary to find ways to reduce it. In academia, sometimes risk and uncertainty are ambiguously and interchangeably related. However, Knight (1921) pioneered the differentiation between risk and uncertainty in a systematic way. According to Knight, a case where the distribution of outcome is known is “Risk” and the case where the distribution of outcome is unknown is “uncertainty”. However, Power (2007) argues that the distinction between risk and uncertainty is in essence an institutional and managerial matter between those events and issues which are expected to be treated with proper management system.

The fact that Banks accepts deposits and transforms them into loans makes them vulnerable to the risk of default. In short, banks are in the risk management operations and should therefore assess and manage credits, leading to prudent banks performance and profitability. Credit risks management therefore are measures employed by banks to avoid or mitigate negative effect of credit. The success of banks performance to a greater extent depends on effective and efficient management of credit risk. Credit risk is the risk of a financial loss to the banking industry if customers or counterparty to a financial instrument fails to meets its contractual obligations and arises principally from the industry’s loans and advances to customers (Heffernan, 1996). Increase in
Credit risk may raise the marginal cost of debt and equity, which will increase the cost of fund for the bank and therefore result to liquidity and solvency constraints. Credit risk is crucial to banks performance since the default of customers can lead to fall in banks assets and undermine solvency. (Bessis, 2002)

According to Nissanke and Aryeetey (1998), credit risk can best be mitigated by banks with repetitive interactions by both banks and borrowers, collateral securities, or be a customer and hold a deposit account with banks for a certain period before credit request are considered. They noted however that, credit request should be based on viability and return on projects, information references with other banks about credit worthiness of borrowers and information from third parties usually superior officers in the same place of work with proper monitoring to mitigate risk of default.

The macroeconomic climate such as inflation rate, interest rates, growth of an economy and the growth of money supply does affect banks performance. In period of slow growth, the demand for credit decreases which ultimately impact negatively on banks performance. However, during boom period-strong growth of an economy may lead to high demand for credit to further stimulate investment (Atthanasglou, 2005). These relationships provide the theoretical underpinnings for the current study.

In terms of the empirical evidence, a number of studies employed financial ratios such as loan loss reserves to gross loans, return on assets, return on equity and non-performing loans etc, to determine the performance of banks and credit risk management. For example, Brewer (1989) to investigate the impact of banks performance on credit risk, using the ratio of bank loans to assets. The result reveals a positive relationship between banks loans and credit risk. However, in a similar study by Altunbas (2005), he finds that improvement in credit risk management strategies might suggest that banks loans to assets negatively related to bank credit risk and concludes that banks loans are relatively illiquid and result to higher default risk than other bank assets.

The study by Ahmed and Ariff (2007), to examine the key determinants of banks performance and credit risk in emerging markets countries and developed countries, the result indicates that risk of default in the emerging economies were higher than that of developed economies, concluding that regulation is significant to the banking system that provides varieties of products and services. Therefore, prudent credit risk management is critical in the case of loan dominated banks in emerging market economies.

To test whether economic conditions affects banks profitability, Mayer and Yeager (2001) employs a set of macroeconomic factors such as inflation and GDP growth, by fitting an OLS model when the return on assets is the dependent variable, the loan loss provision, inflation, GDP growth and non-performing loans as independent variables. Mayer and Yeager (2001) find that GDP growth is significant at the 1% level and impact positively on banks’ profitability. However, the relationship between inflation and banks performance is
mixed.

On balance, literature survey reveals that numerous studies have looked at the determinants of banks’ profitability and its implication on credit risk; results of these studies are mostly inconclusive. These contradictory conclusions emerging from the empirical literature are one of the motivations for the present investigation. To the best of our knowledge, in the context of Sierra Leone this is the first study that looks at how banks performance and its implication on credit risk impacts on the banking industry. Findings of the study contribute to theory by explaining the relationship between banks’ performance and credit risk. This is of important for policy makers who seek to develop policies for sustained banking sector. This understanding is also of significance for investors and businesses who seek to invest in profitable ventures for superior risk-adjusted returns in the banking sector.

3. Methodology and Data

The study adopts a quantitative approach in the analysis. It makes use of Secondary data collected from Bank Scope an Internationally recognized data base covering over 27,600 banks worldwide and Bank of Sierra Leone Annual Reports over fifteen years (1997-2011) period. Due to data limitation a cluster sample of four banks is selected; these banks include; Rokel Commercial Bank (RCB), the Sierra Leone Commercial Bank (SLCB), Union Trust Bank (UTB) and Standard Chartered Bank (SCB) over the period 1997-2011.

As stated earlier, these banks have been rated as the top most four banks in Sierra Leone, and accounted for over fifty eight percent of deposit liabilities with large customer base and also participates fully in the country’s stock exchange market. Despite data limitation, however, sufficient data is available for the purpose of this research. The objective of using secondary data is to link the various explanatory variables that are use as indicators of credit risk to the return of assets (ROA) as indicator of banks performance.

Taking a clue from the studies by Brewer (1989) and Altunbas (2005) to investigate empirically the relationship between banks profitability and credit risk with return on asset and return on equity as measures of banks profitability, the ratio of non-performing loans as indicators of credit risk. However, this study improves on the model by including the natural logarithm of the total assets and the ratio of interest rates spread and total assets to capture empirically their impacts on banks profitability and implication for credit risk. The regression model is therefore specified with the return on assets (ROA) as dependent variable which is an indicator of banks profitability and intended to measure deposit takers efficiency in using their assets. The explanatory variables are as follows:

- TL/TA: the ratio of total loans to total assets denoted as TLA is a measure of credit risk, since most of the revenues of banks are largely driven by loans and are also riskier in nature.
- LLP/TL: the ratio of Loan Loss Provision to total loans denoted as LPT
- NPL/TL: the ratio of non-performing loans to total loans denoted as NPT
• (lnTA): The natural logarithm of the total assets which measures the relative effect of the size of the bank on profitability. It is expected to have positive impact on profitability, this is because as bank grows bigger, the extent of credit risk information is more disclosed and hence lowers risk of default and increases profit.

• IRS/TA: Interest rates spread, which is the difference between the interest rates on loans and the interest rates on deposit, divides by the total assets denoted as IRA. (If the gap is large, it may lead to adverse selection and moral hazard problem posing a high rate of default and thus affect profitability). Otherwise, moderate gap of the IRA may reduce risk of default and increases earning.

The model is specified thus,

\[
\text{ROA} = \alpha_0 + \alpha_1 \frac{\text{TL}}{\text{TA}} + \alpha_2 \frac{\text{LPL}}{\text{TL}} + \alpha_3 \frac{\text{NPL}}{\text{TL}} + \alpha_4 \ln \text{TA} + \alpha_5 \frac{\text{IRS}}{\text{TA}} + \mu_t \ldots (1)
\]

It follows from the above that, the model in equation (1) can be decomposed as follows:

\[
\text{ROA} = \alpha_0 + \alpha_1 \text{TLA} + \alpha_2 \text{LPT} + \alpha_3 \text{NPT} + \alpha_4 \ln \text{TA} + \alpha_5 \text{IRA} + \mu_t \ldots (2)
\]

From equation (2), \(\alpha_1, \alpha_4, \alpha_5 > 0\) or \(< 0\), \(\alpha_2, \alpha_3, <0\) and \(\mu_t\) is the error term.

The rationale for making these restrictions in the above model are based on economic theory and their expected behavior in the signs (coefficients to be estimated) can be tested in the analysis, it implies that a unit increase in the independent variable will lead to a unit decrease \((< 0)\) or increase \((>0)\) in the Return on Assets (ROA).

The study adopts panel data which has the advantage of combining both time-series and cross sectional dimensions, the technique therefore, suffers less from distribution issues and also adjusts for the problem of heterogeneity of the four banks selected for this research. Hence more informative and efficient (Gujarati and Sangeetha, 2007)

3.1 Estimation Procedure

Descriptive statistics is carried to determine the nature of the mean, median, standard deviation, skewness, kurtosis and the Jarque-Bera (JB) test of normality of the distribution. The Panel Least Squares (PLS), regression estimates is applied with common constant effect and the fixed effect estimates to determine the first hypothesis and the correlation matrix is used to determine the second hypothesis. An econometric view (EView-6) is used in the study.

3.1.1 Common Constant (CC) Versus Fixed Effect (FE) Models

The common constant method is based on the assumption that the intercept is the same for the four banks across space and time, the slope coefficients are constant across space and time and the disturbances capture differences over space and time. In effect, this method is equivalently ignoring time and space dimensions. While the fixed effect methods assumes that the intercept varies for each bank (that is over space), but is constant across through time, this allows for a limited degree of bank specific characteristics and disturbances capture differences over space and time. However, the common constants model can be tested against fixed effects (different constants for each cross-section), we carry out an F-test. The common constant model is the restricted model and the fixed effects model is the unrestricted model. (Asteriou and Hall,
2007) We carry out the test thus:

**H₀** (Null hypothesis):- all the constants are the same i.e. Bank performance and its effect on credit risk are similar across banks in Sierra Leone. (Common constants estimates)

**H₁** (Alternative hypothesis):- at least one of the constants are not the same i.e Bank performance and its effect on credit risk varies across banks in Sierra Leone. (Fixed effects estimates), the test statistic is defined as:

\[
F_{stat} = \frac{[R^2_{FE}-R^2_{CC}]/(N-1)}{[R^2_{FE}]/(N.T-k)} \approx \frac{[RSS_{CC}-RSS_{FE}]/(N-1)}{[RSS_{FE}]/(N.T-k)}
\]

(3)

4. Results and Discussions

Table 1: Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Max</th>
<th>Min</th>
<th>Std. Dev</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Jarque-Bera Test</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>0.025</td>
<td>0.024</td>
<td>0.025</td>
<td>0.024</td>
<td>0.0003</td>
<td>0.23</td>
<td>2.32</td>
<td>4.68</td>
<td>0.04</td>
</tr>
<tr>
<td>TLA</td>
<td>0.26</td>
<td>0.25</td>
<td>0.73</td>
<td>0.06</td>
<td>0.14</td>
<td>0.88</td>
<td>3.71</td>
<td>9.35</td>
<td>0.009</td>
</tr>
<tr>
<td>LPT</td>
<td>0.03</td>
<td>0.02</td>
<td>0.20</td>
<td>-0.10</td>
<td>0.05</td>
<td>0.44</td>
<td>4.23</td>
<td>5.8</td>
<td>0.05</td>
</tr>
<tr>
<td>NPT</td>
<td>0.18</td>
<td>0.15</td>
<td>0.64</td>
<td>0.005</td>
<td>0.14</td>
<td>1.22</td>
<td>4.24</td>
<td>18.8</td>
<td>0.00</td>
</tr>
<tr>
<td>lnTA</td>
<td>11.4</td>
<td>11.59</td>
<td>13.2</td>
<td>8.47</td>
<td>0.13</td>
<td>-0.44</td>
<td>2.60</td>
<td>25.73</td>
<td>0.00</td>
</tr>
<tr>
<td>IRA</td>
<td>13.6</td>
<td>12.86</td>
<td>17.3</td>
<td>10.33</td>
<td>2.28</td>
<td>0.31</td>
<td>1.87</td>
<td>4.17</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Note: Max= Maximum, Min=Minimum and Std. Dev=Standard Deviation

The summary statistics as shown in table 1, above indicates that all the series have been found to have a positive mean. The series is also found to have a positive median and are close to the mean values. On average the return on assets (ROA) is 0.025% far below the 2% average return on assets for Sub-Saharan Africa. IRA and lnTA have high variability compared to TLA, LPT and NPT with less variability. This implies that TLA, LPT and NPT can be reasonably managed to guide against high interest rate spread and credit risk of default. All the variables are positively skewed, flatterting to the right as compared to the normal distribution. Except lnTA that is negatively skewed, flattening to the left. The kurtosis values of TLA, LPT and NPT are higher than the normal values of it and suggest that the kurtosis curve is leptokurtic. While the kurtosis values of ROA, lnTA and IRA are lower than the normal values of it suggesting that the kurtosis curve is platykurtic. Generally, the normal value of skewness is ‘Zero’ and for Kurtosis is ‘three’ when the observed series is perfectly normally distributed. Given that none of the values of the series satisfies these conditions of
normality, the series is therefore not normally distributed. The result is consistent with the Jarque-Bera (JB) test statistics in which all its values are not zero or close to zero. The JB test is used to determine whether the given series is normally distributed or not, the null hypothesis is that the series is normally distributed against the alternative hypothesis that the series is not normally distributed. The result of the JB test rejects the null hypothesis that the series is normally distributed. Therefore, the series is not normally distributed.

The Regression results of the OLS are provided below:

**Dependent Variable: ROA**
**Method: Panel Least Squares**
**Sample: 1997 2011**
**Cross-sections included: 4**
**Total panel (balanced) observations: 60**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.006486</td>
<td>0.076028</td>
<td>0.085312</td>
<td>0.9323</td>
</tr>
<tr>
<td>TLA</td>
<td>-0.079220</td>
<td>0.033636</td>
<td>-2.355231</td>
<td>0.0222</td>
</tr>
<tr>
<td>LPT</td>
<td>-0.218742</td>
<td>0.074321</td>
<td>-2.943191</td>
<td>0.0048</td>
</tr>
<tr>
<td>NPT</td>
<td>-0.025820</td>
<td>0.037668</td>
<td>-0.685462</td>
<td>0.4967</td>
</tr>
<tr>
<td>lnTA</td>
<td>0.013639</td>
<td>0.004468</td>
<td>3.052343</td>
<td>0.0035</td>
</tr>
<tr>
<td>IRA</td>
<td>0.005761</td>
<td>0.002645</td>
<td>2.178209</td>
<td>0.0338</td>
</tr>
</tbody>
</table>

R² = 0.691,  DW= 1.87,  N=60

The result in table 2 above shows that LPT, NPT and TLA have negative impact on ROA and are statistically significance at the 1% and 5%. lnTA and IRA have positive impact on ROA and significance at 1% and 5% respectively. In general, all the credit risk indicators are significance and have the expected signs. The coefficient of determination R-squared is 0.691 and the Durbin Watson Statistic is 1.87 which is close to two, suggesting that there is no presence of first order Auto correlation. However, this model assumes that the intercept value is the same for all the four banks, and the slope coefficients of the five credit risk variables are assumed to be identical for the banks. But with close examination of the result in table 2, the intercept value is positive and insignificance. To this end, the restricted assumption is distorting.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>t-statistic</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-0.021412</td>
<td>0.079378</td>
<td>-0.269751</td>
<td>0.7884</td>
</tr>
<tr>
<td>TLA</td>
<td>-0.008955</td>
<td>0.046168</td>
<td>-0.193972</td>
<td>0.0470</td>
</tr>
<tr>
<td>LPT</td>
<td>-0.215020</td>
<td>0.069419</td>
<td>-3.097404</td>
<td>0.0032</td>
</tr>
<tr>
<td>NPT</td>
<td>0.031791</td>
<td>0.039748</td>
<td>0.799815</td>
<td>0.0427</td>
</tr>
<tr>
<td>lnTA</td>
<td>0.013479</td>
<td>0.005455</td>
<td>2.471051</td>
<td>0.0039</td>
</tr>
<tr>
<td>IRA</td>
<td>-0.005752</td>
<td>0.002501</td>
<td>-2.300149</td>
<td>0.0256</td>
</tr>
</tbody>
</table>

R² = 0.752,  DW= 1.92,  N=60
The result of the fixed effect estimates in Table 3, above indicates that all the intercept values of the four banks are statistically significant at 1% and 5% respectively. The R-squared is 0.752, the Durbin Watson statistic is 1.92 and N=60. However, to test whether banks profitability exerts similar effects on credit risk management in Sierra Leone (Cross-Sectional invariant), we use the restricted F-test as specified in equation (3) above.

Hence,

\[ F_{\text{stat}} = \frac{[0.752 - 0.691]/5}{[1 - 0.752]/[60]} = 2.951 \]

Critical value of F at (5, 60); for 5 numerator and 60 denominator degrees of freedom is 3.852. Since the calculated value of the test statistic (2.951) is less-than the critical value (3.852) the common constant is not rejected; we use the common constant effects estimates. Therefore Table 2 above is valid. Hence, banks performance and its effect on credit risk are similar across banks in Sierra Leone (cross-section invariant).

### Table 4: Result of the Correlation Matrix

<table>
<thead>
<tr>
<th>Variables</th>
<th>ROA</th>
<th>TLA</th>
<th>LPT</th>
<th>NPT</th>
<th>lnTA</th>
<th>IRA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TLA</td>
<td>0.10</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LPT</td>
<td>-0.43</td>
<td>-0.17</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NPT</td>
<td>-0.49</td>
<td>-0.11</td>
<td>0.26</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>lnTA</td>
<td>-0.59</td>
<td>-0.12</td>
<td>-0.20</td>
<td>-0.52</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>IRA</td>
<td>0.42</td>
<td>0.47</td>
<td>-0.02</td>
<td>-0.56</td>
<td>-0.53</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The result in Table 4, shows that LPT, NPT and lnTA negatively correlated with ROA, this indicates weak management of credit risk by banks in Sierra Leone. However, TLA and IRS have positive correlation with ROA (moving in the same direction); an increase in TLA and IRA will lead to an increase in ROA. Therefore, the hypothesis that positive correlation exist between bank performance and prudent credit risk management is supported. All the correlation coefficient values are not above 0.7, which suggest that multi-collinearly is not detected.

### 5. Conclusion

The relationship between banking performance and credit risk is crucial in the understanding of the overall stability of the banking sector and economic growth of a country, this research does not undermine banking failure and the consequences it can have on the growth climate. Findings of the current literature are mixed and inconclusive. Despite the intervention of International Development Organizations in supporting the stability of the financial sector including banks, the performance of the banking sector in Sierra Leone still remains to be mixed. To the best of our knowledge, in the Sierra Leone context there are some studies that have attempted to find out the relationship between financial sector development and economic growth in general, but there is no specific study on how banking performance and implication on credit risk management impacts on the stability of banking sector.

These contradictory conclusions emerging from the empirical literature and coupled with poor banking performance of the Sierra
Leone economy motivates this present study. Using data from Bank Scope from 1997-2011, we investigate banking performance and credit risk within the framework of panel least squares (PLS) regression estimate with the common constant effect and the fixed effect (cross-sectional specific) models for Sierra Leone. The regression result shows that banks performance and effect on credit risk are similar across banks in Sierra Leone (cross-section invariant). The hypothesis that positive correlation exists between banks performance and prudent credit risk practices is supported. The ratio of total loans to total assets, the ratio of loan loss provision to total loans and the ratio of non-performing loan to total loan are found to be significant and negatively affect profitability of the commercial banks in Sierra Leone. However, the natural logarithm of the assets that reflects the effect of bank size and the ratio of interest rate spread to total assets are found to have a positive impact on profitability and statistically significance. The positive effect of interest rate spread to total assets is however, weak. This signals that the interest rate spread may not be optimal and consequently posing moral hazard and adverse selection problems. Adverse selection is hidden information problem, while moral hazard is hidden action problem. Therefore, high risky borrowers with bad projects can go for lending with high interest rates on loans and low risky borrowers may opt out, because there is no incentive for their efforts in loan repayment and thus resulting to credit risk of default. To this end, the banking sector in Sierra Leone is relatively uncompetitive. With an uncompetitive banking sector, the cost of capital is very high and therefore slowing down investment and growth.

Our findings have an important implication not only for policy makers and regulators of the banking sector in Sierra Leone but also to development organizations that are assisting in the growth process of the financial sector in Sierra Leone and other Sub-Saharan African Countries. Problem loans are very riskier and the whole effort amounts to throwing good money after bad and hence contributes to banks inefficiency. To this end, the central bank should ensure that moderate and optimal interest rate spread are instituted across banks in Sierra Leone as this can help to mitigate credit risk of default. As highlighted in the previous section, Pro-credit bank a foreign bank could not meet the minimum capital adequacy ratio set by the central bank of Sierra Leone due to high interest rate charged on loans that resulted to bad loan syndrome and thus affecting it liquidity and general operation and ultimately rendered dysfunctional and sold to Eco bank in mid 2010.

Bad loans syndrome which affects the performance of commercial banks requires special attention and prudent credit risk management. To this end, the role of the financial sector is to mobilize savings, allocate resources, manage and diversify risks. If banks can effectively play their intermediation role (i.e. transform collected deposit into loans for investment at fairly established interest rates), they can do this if there is sound credit environment, risk management, judicial and legal support among other considerations. Therefore, Government should strive to attain sound macroeconomic climate, loan administration...
capacity, and compliance with relevant provision of banks and other financial institutions legal instruments and prudential guidelines to make banks more responsive to the needs of the Sierra Leonean populace. Given that the banking sector represents an important share of the financial system in Sierra Leone. Therefore, a more efficient banking system could positively impact financial development and economic growth and hence increasing employment and reducing poverty. Since, economic growth is conventionally expected to reduce poverty.

Despite data limitation, our findings are still relevant and provide solid foundation of achieving broad based stability of the banking sector and attainment of sound financial sector climate. On this basis, we look forward to future study on Banking sector issues with a view to further provoke policy discourse, such study could be the nexus between commercial banks performance and implication on risk management (liquidity risk, market risk, operational risk etc) in Sub Saharan Africa.

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