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# Effects of Non-Performing Loans on the Profitability of Commercial Banks - A Study of Some Selected Banks on the Ghana Stock Exchange

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*Strictly as per the compliance and regulations of:*




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## I. Introduction

Industry in Ghana has been driven largely on credit facilities from the banks and other financial sectors in the Ghanaian economy and has played a pivotal role in our socio-economic development, (Hamisu ,2011). The banking industry has to be applauded for this prominence and influential role. This means that the other industries in Ghana have depended mostly on the financial sector especially the banks for various financial supports and this has contributed to the survival of the Ghanaian economy.

However, many banks in Ghana today are making huge losses due to the problem of non-performing loans in their books. The possibility of a bank to make losses as a result of loans defaults by debtors often happens in the financial sector especially banks. This is clearly a negative effect against the intermediary role the banks play towards the growth of the economy. The rate at which these institutions give credit to businesses and some individuals step up the pace of economic growth of the nation (Kolapo, Ayeni, Oke, 2012).

Ghana banking system is regulated and monitored by the bank of Ghana with the Banking Act made by the parliament of Ghana. The Acts has regulations which guide the activities of all banks and some other financial institutions in the country. Unfortunately, records show that profits in the sector fell sharply in the years 2005 to 2007 to numerous reasons amongst the non-performing loans ratio(NPLR) on the books of most banks but however saw a better liquidity and profitability performance at the close of 2009 (Bank of Ghana, 2012).

Financial institutions all over the world face several risks of nonperforming loans, it is however prudent for these institutions to introduce monitoring mechanisms to follow up with the activities of borrowers. It is well noted that importance of credit risk management has increased particularly in the developing countries for both lenders and borrowers. It is a fact that average bank asset quality worsened sharply due to the global economic meltdown. It is argued however that the poor performance of loans was very uneven in a number of countries. It is also established that a number of variables significantly affect NPL ratios which includes but not limited to lending interest rate, share prices and some risk factors. Non-Performing Loans is the possibility of a borrower defaulting an unpaid loan either partly or in full (Basel Committee on Banking Supervision ,2001), This is in line with Ahmad and Ariff (2007), who stated that NPL is a percentage of loans that are not repaid within three months. The committee further emphasized on credit risk management practices due to the rise of NPLs which is unfavorable to banks achievement of core targets.

Balasubramaniam (2013) outlined some effects that NPLs can have on bank's activities. He argued that

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dealing with NPLs takes essential part of management's time and effort to the detriment of other essential activities of the bank since management could have engaged in fruitful activities to bring good return with the time and effects wasted on NPLS. The author further mentioned that banks do not earn interest income on NPLs and end up losing asset but also waste money to institute specialised departments and hired specialised financial engineers to deal with NPLs. According to Balasubramaniam (2013) NPLs in addition, block income which compels banks to borrow and these results in additional cost to the bank, hence a reputational risk to the bank. If a bank faces NPL problems, it negatively affects its good standing, merging with other institutions to take advantage of better business opportunities.

The study of the impact of credit risk on banks is important because they affect the financial intermediation role of commercial banks which is a core source of income to the banks and ultimately, the financial stability of an economy (Klein, 2013). In this regard, NPLs have gradually drawn attention with the recognition that a result of huge NPL ratios on the books of banks shows clearly the level of inactivity of the economy. This is largely because commercial banks measure their profit performance among other things by the level of loan recoupment and failure to do so adversely impact on the performance (Balasubramaniam, 2013). Khemraj and Pasha (2012) explain that high percentages of NPLs are highly correlated with banks' performances especially in emerging economies. Fofack (2005) also associated banks' heavy accumulation of NPLs with profitability and observed that the NPLs can heavily contribute possible financial distress.

Ghana Banking Survey conducted in 2013 showed that most commercial banks in Ghana are facing huge bad loans, a situation the central bank considered as serious because key banks such as Standard Chartered Bank (SCG), Eco Bank Ghana (EBG), Ghana Commercial Bank (GCB) and Cal Bank (CBG) were not spared. The report did not however indicate the actual outcomes of it but other proofs suggest that bad loans adversely affect the banks' financial condition.

According to Karim, Chan and Hassan (2010), the main effect of bad loans is the ability to hinder the bank to grow financially. This is because bad loans drag banks into liquidity problems and make them unable to extend funds to other potentially viable businesses. Karim et al. also maintained that the banks cannot take up some procreative investment opportunities because of locked up capital due to bad loans and makes banks experience shortfalls in revenue generation.

Ensuring strong credit risk management for building quality loan portfolio is of paramount importance to robust performance of commercial banks as well as overall economy (Charles and Kenneth, 2013). The growing stock of literature in finance and economics underscores that failure in credit risk management is the main source of banking sector crises which possibly leads to economic failure experienced in the past including 2008 global economic financial crises (Fofack, 2005; Onaolapo, 2010). Loan portfolio constitutes the largest operating assets and source of revenue of most financial institutions. However, some of the loans given out become non-performing and adversely affect the profitability and overall financial performance of the lending institutions. Many lending institutions in Ghana are confronted with the challenge of rising non-performing loan portfolios despite efforts at stemming the tide.

This work sought to investigate extensively into how NPL can affect commercial banks profitability performance in Ghana. Thus, this work aims to establish whether non-performing loan has an effect on profitability.

*a) Empirical Review*

The effects of non-performing loans on profitability levels of commercial banks do not occur in a vacuum. Olawale (2014) studied how commercial banks in Nigeria performances are affected by credit risk during the period of 2008 to 2012. The study used a secondary data collected from the companies audited annual accounts published in their websites and also from the publication of the Central Bank of Nigeria. OLS method of analysis was employed. Profitability was measured with ROA as a function of NPLR and Loan and Advances ratio (LA/TD). The author's results show a negative relationship but not significant between loan ratio and total advances in terms of deposits and further shown a significant negative relationship between non-performing loans and advances rate and banks' profitability. The paper further mentioned that banks profitability could be affected inversely by the levels of non-performing loans and advances, thus affecting greatly the banks' liquidity.

Wangai et al., (2014) also examined how the Financial Performance of Kenyan Microfinance Industry has been impacted by Non-Performing Loans and the effects on the survival of small and medium enterprises. This study aimed at establishing how far microfinance banks (MFBs) in Nakuru, Kenya have been affected by non-performing loans over a period of time. They used primary data which was collected from the respondents with a structured questionnaire. The paper analyzed data collected both descriptively and inferentially. It was established that risk associated with credit significantly affected MFBs in Nakuru town's financial performance. The authors further concluded that, increase in credit risk would significantly reduce the financial performance of the MFBs.

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Gizaw et. al. (2015) also in their paper examined how far the profitability performance of commercial banks in Ethopia has been affected by risk associated with credit. The study used a secondary data collected from the companies' respective audited annual accounts published in their websites and also from the publication of the Central Bank of Ethopia. The authors were collected from eight commercial banks from a period of twelve year (2003 to 2014). The data was then analyzed using descriptive statistics. Their results showed that variables such as non-performing loans, loan loss provisions and capital adequacy which were used as proxy for credit risk had a significant impact on commercial banks profitability performance in Ethopia. A panel data model was adapted by the paper in line with Kolade et al. (2012). Return on Asset (ROA) and Return on Equity (ROE) were used by the paper as the indicators of profitability performance. The study recommended that commercial banks in Ethiopia need to institute policies and programmes to check credit risk to ensure their profitability and survival.

Chimkono et al (2016) carried out a study that was intended to examine the relationship that exists between non-performing loan ratio and other factors and financial performance of commercial banks in Malawi covering a7-year period from 2008 to 2014. Correlation research methodologies and multiple regression analysis were adopted. Census study applications were used to collect secondary data from the audited financial statements of 10 commercial banks. In this study, financial performance was measured in terms of return on assets (ROA) while non-performing loans (NPL) was measured as the NPL ratio (which was calculated as a percentage of non-performing loans to gross loans, thus Gross NPLs/ Gross loans). It was discovered that non- performing loan ratio, cost efficiency ratio and average lending rate significantly affected bank performance whereas cash reserve ratio directly associated with performance but was insignificant. The authors suggested that the monetary authorities should provide specific support systems to the banking sector and the banks themselves must provide innovations that would enhance their operations.

Bentum (2012) conducted empirical assessment of the determinants of profitability of commercial banks in Ghana during the global financial rises. To address the research problem, the study aimed at evaluating the impact of bank-specific factors, industry characteristics and macroeconomic factors on profitability in the commercial banking sector in Ghana. Secondary data from the annual reports of the banks for 10 years from 2001 to 2011 were used. Multiple linear regression in the form of fixed effect model (FEM) was used. The dependent variable, ROA was used as a proxy for profitability whereas internal and external factors were used as independent variables. The study reported that profitability was determined by bank-specific variables, industry factors as well as macroeconomic factors. Bank factors that influence profitability, according to the study are capital and reserve to total assets, non-interest income to gross income ratio and the natural log of total deposits. Macroeconomic factors that affected profitability during the study period were real GDP growth rate, annual growth rate of inflation and annual growth rate of money supply.

Ali (2015) conducted an investigation into the effects of credit risk management on the financial performance of commercial banks in Jordan during the period 2005 -2013. The purpose of the study was to examine the influence of credit risk management indicators (such as capital adequacy ratio (CAR), ratio of non-performing loans to gross loans (NPL/GL), ratio of credit interest to credit facilities (CI/CF), leverage ratio and the ratio of facilities loss to net facilities (FL/ NL)) on financial performance (profitability) of commercial banks. Profitability was measured by ROA and ROE. Panel regression in the form of pooled least squares and correlation analysis was carried out along with descriptive statistics. Stationarity of the variables was tested with the ADF. Secondary data from the annual reports of 13 banks were used and analyzed. Empirical findings indicate that the ratio of non-performing loans to gross loans positively related to financial performance and an inverse relationship was found between the ratio of facilities loss to net facilities and financial performance but no impact of CAR and CI/CF on financial performance was recorded. The study recommended an improvement in the credit management procedures through an establishment of appropriate policies.

Nkegbe & Yazidu (2015) investigated the trends and determinants of bank performance in Ghana. Panel data regression models were estimated for analysis along with trend graphs and equations. Secondary data from the annual reports of 27 banks covering the period 2000- 2010 were used for the study. Performance which was represented by profitability was measured in terms of ROE, ROA and NIM (Net Interest Margin). Among the independent variables used as determinants of profitability were liquidity, non-performing loans (NPL), bank size (MSL) and operational efficiency. The study reported a negative trend in bank performance and a positive relation between market of loan and bank performance. Macroeconomic factors that the study cited as drivers of profitability were GDP, CPI and broad money supply (M2+). Results further indicated that liquidity, market share of loans and operational efficiency had a positive association with all profitability indicators. But NPL was reported as having negative relation with ROE and ROA. Provision of training to the informal sector on financial statement preparation was suggested as a means of dealing with NPL.



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Beck et al (2013) conducted an empirical study on the determinants of non-performing loans (NPL) in seventy-five countries in a dynamic panel regression, fixed and random effects framework. Secondary data set for the period 2000-2010 was used. The ratio of NPL to gross loans was used as the dependent variable. Empirical results indicate that real GDP growth, share prices, exchange rates and lending rates significantly influenced NPL. Of these factors, real GDP growth was mentioned as the main driver of CR.

Asantey & Tengey (2014) studied the effects of bad loans on banks' lending ability and financial performance using secondary data from the annual reports of four listed commercial banks (Eco bank, GCB Bank, CAL Bank, and Agricultural Development Bank) for a-5 year period covering 2008 to 2013. The aim of the paper was to examine the effects of bad loans on the lending ability and net profit (return on investment) of the banks. Pearson correlation test and OLS were used to examine the data. The study discovered a high negative correlation between bad loans and lending ability at 0.05 alpha level and a high negative correlation between bad loans and financial performance, measured as return on investment or net profit at 0.05 level.

## II. Material and Methodology

The study uses positive quantitative research paradigm which is appropriate because it enables the capturing of knowledge through measurements of phenomena in which mathematical and statistical procedures are used to describe, predict and explain behavioral phenomena (Krasuses, 2005). The study is basically a quantitative research that aimed at examining the effect of non- performing loans on the profitability of commercial banks as it involves the collection and analysis of audited financial reports using statistical methods. The use of statistical modeling enables the researcher estimate and establishes the existence of causal relationships between the variables of interest.

The study used secondary data that span from 2009 to 2016. Annual time series data for each of the variables; return on equity (ROE), Non-Performing Loan Ratio (NPLR),Bank Size (BS) and Capital Adequacy Ratio (CAR) were sourced from audited annual financial reports of the Standard Chartered Bank (SCG), Eco Bank Ghana (EBG) Ghana Commercial Bank (GCB) and Cal Bank (CBG). Data on consumer price index used as a proxy for inflation (INFL) was obtained from the Ghana Statistical Services annual bulletin. The choice of these variables was informed by literature on the effect of non-performing loans on the profitability of commercial banks in Ghana.

### *a) Model Specification*

With the central aim of investigating the effect of non-performing loans on the profitability of commercial banks understudy, the present study followed a panel data model employed by Gizaw et al. (2015) in their investigation of the impact of credit risk on profitability performance of commercial banks in Ethiopia. This study added inflation (INFL) as a control variable to the model to capture the role of price volatility on profitability of banks. Profitability (ROE) is therefore stated as a function of NPLR, CAR, BS and INFL and it is expressed mathematically as:

$$ROE = f(NPLR, CAR, BS, INFL) \quad (1)$$

The regression models are thus formulated as

$$P_1 = \beta_0 + \beta_1 NPLR_i + \beta_2 CAR_i + \beta_3 BS_i + \beta_4 INFL_i + \varepsilon \quad (2)$$

From equation (2): $P_1$ refers to profitability measured by ROE; $\beta_0$ is a constant term; $\beta_1$, $\beta_2$, $\beta_3$ and $\beta_4$ are coefficients of explanatory variables to be estimated; $NPLR_i$ refers to non-performing loan ratio, $CAR_i$ represents capital adequacy ratio, $BS_i$ represents bank size $INFL_i$ represents the rate of inflation and $\varepsilon$ is the error term assumed to be normally and independently distributed with zero mean and constant variance, which captures all other explanatory variables which impact profitability but were not captured in the model.

Return on equity (ROE) refers to the proportion of net income to total equity. Total equity is the amount of funds invested by owners (shareholders) of a company. ROE is calculated as net income divided by total owners' equity and it gives an indication of the rate of return made by owners' equity. Thus, it is a financial ratio that compares the earnings attributable to ordinary shareholders with the book value of their investment in the business. A higher value of ROE means that the company has the ability to generate cash internally and the better for the company in terms of profit generation. ROE has also been extensively used in the literature as a measure of how profitable it is for investors (shareholders) to invest their funds in companies (Hassan & Bashir, 2003).

Non-Performing Loan Ratio (NPLR) is the ratio of non-performing loans to total loans and advances. It is one of the major indicators of credit risk and a measure of credit quality and it shows the proportion of total loans and advances that are in default or overdue for more than 90 days. Some studies have reported a negative linkage between NPLR and profitability (see for example Nkebe and Yazidu, 2015; Gizaw et al., 2015;

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Chimkono et., al. 2016 and Olawale ,2014). A negative relationship is therefore expected between NPL and profitability, thus, $\beta_1 < 0$.

Capital adequacy ratio (CAR) refers to the percentage of total owners' equity and reserves that the banks are expected to hold against risky assets. It is meant to safeguard depositors against unanticipated losses. CAR is measured as tier 1 capital plus tier 2 capital divided by risk adjusted assets. Literature has shown that CAR can be negatively or positively related to profitability. For example Garba (2014) and Ali (2015), reported a positive and a negative relationship between capital adequacy ratio and financial performance respectively, Thus, $\beta_2 < 0$ or $\beta_2 > 0$.

Bank size ($BS_i$) is proxied for the book value of total assets of each bank. This representation was adopted from the empirical studies of Alper and Anbar (2011). Positive effect of bank size on profitability has been reported in the literature (see the works of Alper and Anbar (2011) whiles others such as Naceur (2003) have had a negative linkage. Therefore, $\beta_3 < 0$ or $\beta_3 > 0$

Inflation ($INFL_i$) refers to the rate at which general price level rises in an economy in a year. The consumer price index is used as a proxy for inflation in this study. Accurate and precise prediction of inflation can have a positive impact on profitability and vice versa (Ali, 2015). Empirical research works have mainly reported positive effect of inflation on financial performance (see Athanasoglou et al., (2008); and Davydenko, 2010). In this study, it is assumed that inflation has a negative effect on profitability. That is $\beta_5 < 0$.

*b) Method of Estimation and Testing*

i. *Panel data regression model specifications*

Panel data can be estimated and analyzed in three different specification models. These are the correlation matrics, the Fixed Effect Model (FEM) and the Random Effect Model (REM). In this study, the fixed effect model is chosen over pooled OLS regression because of the advantages the former has over the latter.

ii. *Pooled Regression Model*

To obtain a reliable and unbiased estimate for analysis, this estimation method uses the classical linear regression assumptions which according to Albright, Zappe and Winston, (2011) stipulate that the error term should be independently and normally distributed with zero mean and constant variance and more importantly must not correlated with the independent variables. The pooled OLS linear regression is given as follows:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{4it} + \beta_4 X_{5it} + U_{it} \quad (3)$$

where $Y_{it}$ is the dependent variable; $\beta_0$ is a constant term; $X_1$ to $X_4$ are the independent variables; $\beta_1$ to $\beta_4$ are slope parameters; i…n refers to the cross-sectional units and t is the time period. Using this regression specification, the model for this study is thus written as:

$$ROE_{it} = \beta_0 + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 BS_{it} + \beta_4 INFL_{it} + U_{it} \quad (4)$$

Gujarati (2009) opined that pooled OLS regression model has the advantage of being the simplest, easy to understand and interpret as compared to the other models but the model is associated with some weaknesses. It assumes that cross-sectional units are homogeneous. This assumption may not be realistic. For example, the slope coefficients and intercept must be the same for all the banks that constitute cross-sectional units in this study. This may not be possible and it may be wrong to make this assumption. The error term is assumed to have taken care of the individual bank specific effects and the time components of data. Another weakness of pooled OLS regression may be the existence of autocorrelation in the model which results in errors and invalid conclusions.

iii. *The fixed effect model (FEM)*

The fixed effect model is highly comparable to the pooled OLS regression model in the sense that the slope coefficient is the same for all cross-sectional units and that the intercept remains unchanged across time. One difference between them is that the fixed effect model recognizes heterogeneity among cross-sectional units as against homogeneous units in the case of the pooled OLS regression model. Thus, under the fixed effect model, individual specific effects of cross-sectional units are captured (Batalgi, 2005). In this study individual bank specific effects may include the level of innovation, policies, location, marketing strategies, skills of workforce, clientele base etc. Employing the fixed effect least-squares dummy variable (LSDV) approach, the issue of heterogeneity is taken care of by providing different intercepts for every cross-sectional unit (Brooks, 2008). The fixed model can be specified as:

$$Y_{it} = \alpha_i + \beta_1 X_{it} + \beta_2 X_{it} + \beta_3 X_{it} + \beta_4 X_{it} + U_{it} \quad (8a);$$

Where i in $\alpha_i$ refers to the cross-sectional units representing the intercept values for each cross-sectional unit. Now, inserting the independent variables of this study into this model yields the following equations:

$$ROE_{it} = \alpha_i + \beta_1 NPLR_{it} + \beta_2 CAR_{it} + \beta_3 BS_{it} + \beta_4 INFL_{it} + U_{it} \quad (8b)$$



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Among other things, the fixed effect least-squares dummy variable (LSDV) approach is limited by its inability to deal with large samples. It has been stated that larger number of cross sectional units results in a bigger decrease in the degree of freedom (Hsiao, 2006). But Batalgi (2005), believes that this issue is solved with the use of the fixed effect within-group estimator methodology. This approach makes use of de-meaned values of variables to estimate associations. It also does away with large decreases in the degree of freedom associated with large samples. One central weakness of this model according to Hsiao, (2006), has to do with the issue of multicollinearity, which emerges in large samples of cross-sectional units. A linear relationship between two or more independent variables describes the concept of multicollinearity where standard errors are extremely higher hence estimations are distorted. Moreover, the FEM is able to deal with time variant variables only, compared to time invariant ones in estimating coefficients.

## III. Results and Discussions

*a) Data Analysis*

According to Brooks (2008), panel data is a data which comprises both cross-sectional and times series characteristics. Panel data analysis is appropriate and significant for this study as it is able to capture heterogeneity among the banks under study. This study uses the fixed effect model to analyse panel data.

*b) Correlation Analysis*

The importance of correlation analysis is to ensure that independent variables are not correlated with each other to avoid multicollinearity. Correlation also provides information regarding the linear association between the dependent variable and each of the independent variables. Correlation refers to the strength of linear associations between two or more Variables (Albright et al., 2011).

*Table 1:* Correlation Matrix

| Correlation | BS | CAR | INF | NPLR | ROE |
|---|---|---|---|---|---|
| BS | 1.000000 | | | | |
| CAR | 0.306883 | 1.000000 | | | |
| INF | 0.142691 | 0.174249 | 1.000000 | | |
| NPLR | 0.286683 | -0.001812 | 0.273259 | 1.000000 | |
| ROE | 0.541974 | 0.497600 | 0.014432 | -0.055613 | 1.000000 |

From table 1 above all the independent variables have weak to moderate correlation and therefore do not pose any problem of multicollinearity. Interestingly, NPLR is negatively correlated to ROE while CAR is positively correlated which satisfy the prepositions on the effects of NPLR and CAR on profitability. More so, ROE are highly positive correlated also fulfil the condition that ROE can be good proxy for profitability.

*c) Fixed Effects Model*

According to Batalgi (2005), the fixed effects model is akin to the pooled regression model in that it follows classic linear regression assumptions, and that its slope coefficients remain the same for the cross-section units under study. One of the advantages of the fixed effects model is that unlike the pooled regression model it considers heterogeneity among the cross-section units by giving a different intercept for each cross-section unit. In this study, the four banks have different intercepts.

*Table 2:* Fixed effects model: Dependable Variable (ROE)

| Variables | Coefficient | Std. Error | t-statistic | P-Values |
|---|---|---|---|---|
| NPLR | -2.071178 | 0.797842 | -2.595975 | 0.0130* |
| CAR | -0.619268 | 0.436040 | -1.420209 | 0.1631 |
| BS | 0.057950 | 0.028339 | 2.044898 | 0.0473* |
| INF | -0.002487 | 0.005611 | -0.443180 | 0.6600 |
| Constant | -0.531453 | 0.575378 | -0.923659 | 0.3611 |
| R2<br>Adjusted $R^2$ | 0.885643<br>0.863329 | | | |
| F-Statistic<br>Prob(F-Statistic) | 39.69073<br>0.000000 | | | |

**, ** and *** indicate significance levels at 1%, 5% and 10% respectively. Source: SCG, EBG, GCB and CBG and SGB (2006 – 2015)*



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*Table 3:* Correlated Random fixed effects- Hausman test

| Effects test | Statistic | Chi-Sq. d.f | Prob. |
|---|---|---|---|
| Cross section Chi-square | 13.013826 | 4 | 0.0112 |

*Source: SCG, EBG, GCB and CBG (2006 – 2015)*

Tables 2 and 3 above presents the fixed effects model results. The results are based on 40 balanced observations pooled from the four major banks for the years 2006 to 2015 with ROE as the dependent variables respectively.

The results are in conformity with the prepositions for all the research variables. The p-values for almost all research variables are less than 0.05 which indicates a significant relationship between the dependent variables and the independent variables. The annual inflation is however insignificant since the p-value is greater than 0.05, which is consistent with Chin' Anga (2015) and Wangai, Bosire and Gathogo (2014).

After the pooled regression model and the fixed effects model estimations to ascertain the relationship between the independent variables and the dependent variables it then becomes essential to select the best model and give a more detailed summary of the results of the best model.

In order to choose the most appropriate model a fixed effect redundant test was employed to estimate whether the cross-section units are the same. The null hypothesis forfixed effect redundant testing is, 'The fixed effects are redundant' (De Sousa -Brown, 2008: 87).'

*d) Presentation of the fixed effect redundant test results*

The null hypothesis is rejected at the 0.05 level of significance as indicated by the test statistic and the p-values on the table. This indicates that heterogeneity exists among the five banks. Since the pooled regression model does not consider heterogeneity among the banks, the most appropriate model to use is the fixed effects model.

The standard errors of the estimators are made to be robust in order to control the presence of heteroskedacicity and autocorrelations in the variables. As indicated in table 2 the $R^2$ for the model is 89% which shows that the nonperforming loans indicators, thus the independent variables in the model (NPLR, CAR, BS) explains 89% of change in profitability performance of Ghanaian Commercial banks measured by ROE.

Coming to the effect of each independent variable, the results in table 2 indicates that the rate of nonperforming loan to total loan and advances (NPLR) negatively affect profitability measured by ROE at 1% significant level. This implies that a unit increase in non-performing loan amount will result in 25% decrease in ROE. Contrary to this, the rate of CAR shows a positive effect at 0.05 significant level. This means that holding all other variable constant, a unit increase in CAR brings a 11% unit change on ROE. BS equally shows a positive relationship with ROE, this means a unit increase in BS will increase ROE by 1% at 1% significant level. The results from the model, presented by table 2 also show $R^2$ to be 89% suggesting that the independent variables in the model explained 89 % of the variations on profitability performance measured by ROE.

In reference to the effect of each independent variable, the result in table 2 indicates that NPLR and BS negatively and positively affect ROE at 0.01 and 0.05 significant levels respectively. This means that a unit increase in BS will results in approximately 6% increase in ROE. The results general show ROE of commercial banks in Ghana is highly sensitive to ratio of nonperforming loan to total loan and advances (NPLR), CAR and BS. However, the effect CAR has on ROE is not statistically significant.

The Adjusted R-squared value of 0.863329 implies that about 86% of the variations in the ROA and ROE are explained by variations in the independent variables used for this study. This means that other variables can explain 14% of variations of ROE. Further, the F-statistics values of 41.47419* for ROE indicates that the independent variables used for this study jointly and significantly affect profitability.

*e) Discussion of results*

Tables 2 and 3 show the results of the study using thefixed effect model. Balanced panel da ta are used for 2006 to 2015 with a total of 40 observations from four sampled banks with ROE as the dependent variables. NPLR and CAR are the study's main independent variables which represent nonperforming loans of profitability. The results for the first proposition (P1) on CAR; CAR has a positive effect on profitability are confirmed in the ROE model. That means that a unit increase in CAR will results in an equal increase in the banks' profit and are consistent with Molyneux and Thornton (1992), Berger et al. (1995), Naceur (2003), Goddard et al. (2004) Brewer and Jackson (2006). Havrylchyk et al. (2006), Athanasoglw et a1. (3008), Ara et al. (2009), Ramlall (2009) and Oladele et al. (2012).

Consistent with the findings of Buyuksalvarci and Abdiogiu (2011) and Qin and Dickson (2012), this study shows that CAR has a significant negative effect on ROE. In this regard, Ezike and Oke (2013) stated that holding capital beyond the optimal level would inversely affect the efficiency and profitability of banks. Though the minimum CAR requirement of Commercial banks in Ghana is 10%, (Banking Act, 2004, Act 673), the descriptive statistics indicated average CAR of the banks under study was 16%, higher than the minimum requirement. Taking the argument of Ezike and Oke



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(2013) the prevalent negative relationship between CAR and profitability appears to result from having reserves beyond the necessary amount enough to handle unexpected risk the banks may encounter.

However, the results for the second proposition (P2), Contrary to the CAR results, NPLR has a negative relationship with ROE.Interpretations from the table 2 and 3 suggest that NPLR which measures the extent of nonperforming loans show a statistically significant large negative effect on profitability measured by ROE. It thus means that a unit increase in NPLR will cause an equal decrease in the profitability of the banks under review. This results is consistence with studies by Godlewski (2004), Achou and Tenguh (2008), Ara et al. (2009) and Aduda and Gitonga (2011), Poudel (2012), Funso et al.(2012) and Chen (2008), who found that increases in NPLR reduce profitability in banks. Consistence with findings of previous studies in Ghana and elsewhere, the criticality of risk nonperforming loans has on efficient utilization of asset by Ghanaian commercial banks is illustrated here.

The empirical results of bank size (BS) were in line with the third proposition (P3). BS has a positive relationship with profitability explained by ROE which is inconsistent with similar studies by Goddard, Molyneux and Naceur (2003) and Javaid et al. (2011) who found bank size to impact on bank profits negatively. Bank size prove to have a positive effect on profitability in Ghanaian banks as shown by the positive coefficient.

Even though the proposed effect on profitability (P4), the effect of inflation on profitability is confirmed, it is insignificant since its p-values is 0.6600, far above the bench mark probability value of 0.05. This is consistence with studies by Revel (1979) and Perry (1992) who found that inflation could have either a positive or negative effect on profitability. The model as a whole indicates a high prediction of the percentage of variation in ROE explained by all independent variables as revealed by the adjusted $R^2$. Adjusted $R^2$ shows that 86.33% of the variations in ROE can be explained by the explanatory variables.

The interestingly from the descriptive statistics and the observation of the trend on NPL in Ghanaian banks as per the study of Getahum (2012) and Metahun (2012) showed some decline which indicates that managers and policy makers in Ghana have strengthen their credit management strategies in the banking industry.

## IV. Conclusion

The paper was set out to identify the prevailing relationship between non-performing loans and profitability performance of commercial banks in Ghana. Previous studies in Ghana are few and studies in general were inconclusive. Motivated to fill this gap a descriptive statistics and panel data regression analysis were employed on secondary data collected from five commercial banks listed on the Ghana Stock Exchange for a period of 10 years (2006 - 2015).

The study found the fixed effects model to be the most appropriate method to analyse the data. A detailed analysis of the results from the fixed effects model is presented. The study finds that non-performing loans has an effect on profitability in Ghanaian banks as expected, with CAR having a positive significant effect and NPLR having a negative significant effect on profitability at the 1% level of significance in line with the study by Ara et al (2009). This suggests that credit risk management could be used to enhance profitability in banks by increasing capital adequacy requirements.

The result revealed that nonperforming loans (credit risk) profile of Ghanaian banks had been improving during the study period. The ratio of nonperforming loan (credit risk) is gradually declining in past years. The CAR of commercial banks was found to be higher than the regulatory requirement (Banking Act, 2004, Act 673) at local and international level, but the descriptive analysis proved commercial banks in Ghana have adequate capital to absorb shocks resulting from non-performing loans and other operational risks. The study found that non-performing loans and capital adequacy have a negative and positive significant impact respectively on profitability of commercial banks in Ghana.

Having underscore a significant overall effect of the effect of non-performing loans on the profitability of commercial banks in Ghana, it is suggested that a rigor credit risk management process is of paramount importance to the banks. Hence managers are advised to employ a modern credit risk management technique and diversify the earning activity of their respective banks. Banks should also be cautious on the rate they expand since bank size can equally affect their fortunes. Government, in collaboration with the central bank has to control the macro-economic variables such us inflation and exchange rate (cedi depreciation) since they also impact on profitability of banks.

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