The impact of credit risk management on the financial performance of Ethiopian commercial banks

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Abstract: *The main purpose of this research is to investigate the relationship between credit risk management and financial performance of Ethiopian commercial banks over a period of years 2010-2014. The research is hypothesis testing in type. LOGROA and LOGROE used as dependent variables measures financial performance and capital adequacy ratio, asset quality, management soundness, earnings and liquidity ratio used as independent variables measures of credit risk management. The hausman test is applied. Correlations and fixed regression analysis used to do the empirical analysis using eviews software. The findings uncovered that capital adequacy ratio and asset quality is insignificant to impact LOGROA while management soundness, earnings and liquidity ratio are significant. Thus H01 and H02 accepted whereas hypothesis H03, H04 and H05 are rejected. The findings further revealed that capital adequacy ratio, asset quality and earnings are insignificant to impact LOGROE while management soundness and liquidity are significant. Therefore hypothesis H01, H02 and H04 accepted whilst H03 and H05 rejected.*
Keywords: *Credit, credit risk, LOGROA, LOGROE and risk management*

I. Introduction

Banks are firms that efficiently provide a wide range of financial services for profit. Not surprising, banks have an important role in the economy and the society as a whole. Their central role is to make the community's surplus of deposits and investments useful by lending it to people for various investment purposes: company growth, education, houses etc. Baesens and Gestel (2009). The provision of deposit and loan products normally distinguishes banks' from other types of financial firms. Deposits are liabilities for banks, which must be managed if the bank is to maximise profit. Likewise, they manage the assets created by lending. Thus, the core activity is to act as intermediaries between depositors and borrowers. Other financial institutions, such as stockbrokers are also intermediaries between buyers and sellers of shares but it is the taking of deposits and the granting of loans that singles out a bank, though many offer other financial services Heffernan (2005).

Like any other firm, banks are exposed to classical operational risks like infrastructure breakdown, supply problems, environmental risks etc. More typical and important for a bank are the financial risks it takes by its transformation and brokerage function. A bank raises funds by attracting deposits, borrowing on the interbank market or issuing debt instruments on the financial market. Essentially, the bank's main activity is to buy and sell financial products with different profit and risk characteristics. This transformation from supply to demand side is not without risk. Banks are exposed to credit, market, operational, interest rate and liquidity risk. The appropriate management of these risks is a key issue to reduce the earnings risk of the bank and to reduce the risk that the bank becomes insolvent and that depositors cannot be refunded Baesens and Gestel (2009).

The institute of company secretary of India states that a risk arises on account of an uncertain event, which might result in a loss or gain to the parties associated with such risk. Even though the risk is an independent event, invariably risks are interlinked in the sense; one risk may lead to other risks as well. On account of default in payment by borrower a bank faces credit risk. On account of the non-receipt of the funds a bank would face another risk called liquidity risk. Not only that, it would lead to a situation of asset liability mismatch (gap risk) for bank. In view of the shortage of funds and also to manage the mismatch in its asset-liability, bank should arrange for funds from accepting new deposits and/or approach the market to borrow at the markets interest rate. Hence bank would be facing the market risk (and needs to pay the market interest rate).

Risk-based policies and practices have a common goal; enhancing the risk–return profile of the bank portfolio. The innovation in this area is the gradual extension of new quantified risk measures to all categories of risks, providing new views on risks, in addition to qualitative indicators of risks Joel Bessis (2002).

Because of the nature of their business, commercial banks are by default susceptible to the default risk by the counter party to settle its obligations as agreed. Lending is a business for commercial banks and it is the main source of risk-credit risk as well. Thus prudent credit risk assessment and instituting proper credit risk management techniques suitable with the environment in which a bank operates worth's to caution the bank's risk.

In line with this, recognizing the importance of credit risk management, there are a few local level studies that have addressed the impact of credit risk management on the financial performance of Ethiopian commercial banks.

A survey study by the National Bank of Ethiopia (NBE) 2009, presented that irrespective of the strengths by Ethiopian commercial banks in the management of risks, weaknesses dominate Ethiopian commercial banking sector risk management.

Mekasha (2011) studied credit risk and its impact on the performance of a sample of six Ethiopian commercial banks using return on asset as a surrogate of performance and nonperforming loan to total loan ratio, loan provisions to nonperforming loan ratio, loan provision to total loan ratio and loan provision to total assets ratio used as a surrogate of credit risk measures. The result revealed that nonperforming loan to total loan ratio and loan provision to total loan ratio have inverse relationship with return on asset but only nonperforming loan to total loan was statistically significant. Whereas loan provision to nonperforming loan and loan provision to total asset have positive association with return on asset but both are insignificant to impact return on asset.

Awoke (2014) conducted a study on the impact of credit risk on the performance of samples of eight commercial banks in Ethiopia over the period of years 2008-2012 using return on asset as dependent variable and provision to total loans, loans to total assets, cost to total loans and natural logarithm of total asset as independent variables. The findings shown that provisions to total loans and cost to total loans have inverse association with return on asset but loans to total assets and the natural logarithm of total assets have positive association with return on asset and all variables have significant impact on return on asset.

Bizuayehu (2015) carried out a study on the impact of credit risk on the financial performance of banks in Ethiopia using bank specific and macroeconomic factors covering a period of years 2003-2008. Return on equity used as a proxy for financial performance and nonperforming loan to total loan ratio, capital adequacy ratio and total loan to deposit ratio, bank size, interest rate spread, gross domestic product and inflation rate as a proxy for credit risk. The study revealed that both bank specific factors and macroeconomic factors have inverse association with return on equity but only the bank specific factors are significant factors influencing return on equity.

Gizaw, Kebede and Selvaraj (2015) evaluated the impact of credit risk on the performance of commercial banks in Ethiopia over a period of years 2003-2004. Return on asset and return on equity used as proxy of performance and nonperforming loan to total loan ratio, capital adequacy ratio, loan and advance to deposit ratio and loan loss provision to total loan ratio were used as a proxy for credit risk. The findings revealed that non-performing loan to total loan and loan and advances to deposit have inverse association with return on asset while the other two have positive association with return on asset. However; only nonperforming loan to total loan and loan loss provision to total loan are statistically significant to impact return on asset. Further, the study revealed that except loan loss provision to total loan ratio all the proxies of credit risk have inverse relationship with return on equity and all are significant factors impacting return on equity.

To sum up, to the best of the researcher's understanding, Mekasha, 2011; Awoke, 2014; Bizuayehu, 2015 and Gizaw, Kebede and Selvaraj, 2015 are the only studies carried out in Ethiopia's commercial banking sector context entitled as the impact of credit risk management on the financial performance of Ethiopian commercial banks till this research is in effect. Even though the studies have attempted to contribute their fair share to the existing literature in some way, they are not adequate studies. Therefore; there is a need to study the impact of credit risk management on the financial performance of Ethiopian commercial banks. As a result; the current study shades the gap in the literature by employing alternative econometric models. Therefore; the main purpose of this research is in order to examine the impact of credit risk measures capital adequacy ratio, asset quality, management soundness, earnings and liquidity ratio on measures of financial performance return on asset and return on equity.

II. Literature review

There are dearths of researches on the impact of credit risk management on the financial performance of commercial banks across the globe. This sections under takes the survey of some of relevant empirical studies on the impact of credit risk management on the financial performance commercial banks elsewhere.

Hosna, Manzura and Juanjuan (2009) ascertained credit risk management and profitability of commercial banks in Sweden over the period of years 2000-2008. Return on equity was used as profitability indicator while non-performing loan ratio and capital adequacy ratio were used as credit risk management indicators. The study revealed that credit management has effect on profitability of the sample banks but it varies across banks.

Aduda and Gitonga (2011) examined the relationship between credit risk management and profitability among commercial banks in Kenya spanning from 2000-2009. A correlations and regression analysis was used to do the empirical analysis. Return on equity was used as a dependent variable and non-performing loan ratio as explanatory variable. The study revealed that there is a linear relationship between return on equity and

nonperforming loan ratio and nonperforming loan ratio can be used as a measure of credit risk management which affects profitability at a reasonable level.

Boahene, Dasah and Agyei (2012) carried out a study on credit risk and profitability of selected banks in Ghana over the periods of 2005-2009. Return on equity used as dependent variable and net charge-off rate, non-performing loan rate and the pre-provision profit as a percentage of net total loans and advances as independent variables while bank size, growth and capital structure were used as control variables. The study found that there was positive and significant relationship between credit risk and profitability of the selected banks in Ghana over the study period.

Poudel (2012) conducted a study on the impact of credit risk management on the financial performance of commercial banks in Nepal for the period of years 2001-2011. Return on asset was used as a proxy for financial performance and default rate, cost per loan assets and capital adequacy ratio as a proxy of credit risk management. The study revealed that all credit risk indicators have an inverse impact on banks' financial performance however the default rate is the most predictor of financial performance.

Fredrik (2012) investigated the impact of credit risk management on the financial performance of commercial banks in Kenya over the periods of years 2006-2010. CAMEL components were used as a vector of credit risk management and return on equity as a vector for financial performance. The study has shown that there is a strong relationship between the CAMEL components and return on equity.

Mwangi (2012) conducted a study on the effect of credit risk management on the financial performance of commercial banks in Kenya over a period of years 2007-2011 utilizing return on equity as dependent variable and nonperforming loan ratio and capital adequacy ratio as independent variables. The findings of the study unveiled that nonperforming loan ratio and capital adequacy ratio impacts return on equity inversely and they are statistically significant factors that impacts return on equity.

Kurawa and Garba (2014) evaluated the effect of credit risk management on the profitability of Nigerian banks covering a period of 2002-2011. Return on asset was used as a proxy of profitability and default rate, cost per loan asset, capital adequacy ratio and age were used as a proxy for credit risk management. The finding showed that default rate, cost per loan assets and capital adequacy ratio impacts return on asset positively but only default rate and cost per loan assets are statistically significant. Conversely, the study unveiled that there is negative but significant relationship between age and return on asset.

M.Ojo et al. (2012) studied the impact of credit risk on commercial banks' performance in Nigeria for the period of 2000-2010. Return on asset used as dependent variable and ratio of non-performing loan to loan and advances, ratio of total loan and advances to total deposit and the ratio of loan loss provision to classified loan as a measure of credit risk. A panel regression analysis was used in order to perform the statistical analysis. The study found that the effect of credit risk on the performance of Nigerian banks over the study periods was cross sectional in variant i.e. the effect is similar across banks.

Muritala and Taiwo (2013) carried out a study on the impact of credit risk management on the profitability of Nigerian banks over the period of years 2006-2010. Return on asset was used as a surrogate of profitability and the ratio of loan & advances to total asset and nonperforming loan to total loan were used as a surrogate of credit risk. The study revealed that both loan & advances to total asset and nonperforming loan to total loan have inverse association with profitability and they significantly impact profitability-return on asset.

Afriyie and Akotey (2013) studied on credit risk management and profitability of rural banks in the Brong Ahafo region of Ghana over the period of years 2006-2010. Return on asset and return on equity were used as a proxy for profitability while nonperforming loans ratio and capital adequacy ratio as a proxy for credit risk management. The result of the study unveiled that nonperforming loans ratio and capital adequacy ratios have positive association with profitability but only nonperforming loan ratio is a significant variable to influence profitability.

Kaaya and Pastory (2013) conducted a study on credit risk and commercial banks performance in Tanzania. Return on asset was used as a vector of financial performance and loan loss to gross loan, non-performing loan, loan loss to net loan, impaired loan to gross loan were used as vectors of credit risk. A multiple regression analysis was used to do the empirical analysis. Bank size and deposit were used as control variables in the analysis. The study revealed that there is a negative and statistically significant association between the credit risk indicators and financial performance over the study period.

Charles and Kenneth (2013) conducted a study on the impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria for the period of 2004-2009. Return on asset was used as a dependent variable and loan loss provision, loans and advances, non-performing loans and capital adequacy ratio as independent variables. The study has shown that sound credit risk management and capital adequacy impacted positively on bank's financial performance with the exception of loans and advances which was found to have a negative impact on the bank's financial performance.

Olawale et al. (2013) studied risk management and financial performance of banks in Nigeria for the period of 2006-2009 by using return on equity and return on asset used as dependent variables and doubt loans

and capital asset ratio as independent variables. The result of the study shows an inverse relationship between financial performance and doubt loans and statistically insignificant while capital asset ratio was found to be positive and significant.

Abdelrahim (2013) carried out a study on the effectiveness of credit risk management of Saudi banks in the light of global financial crises. Return on equity was used as a proxy for financial performance and CAMEL components as a proxy of credit risk management. The study found out a positive and statistically significant relationship between effective credit risk management and liquidity and positive but insignificant relationship between credit risk management and capital adequacy, asset quality, management soundness and earnings.

III. Research methodology
The study used a panel data from eleven Ethiopian commercial banks. The main sources of data were the audited financial statements of the banks over the period of years 2010-2014. The study employed a hypothesis testing research design as the study wants to establish the relationship among variables. Correlations and fixed effect regression analysis used to do the empirical analysis using eviews software used. The result of analysis is presented in the form of tables. The econometric tests such as normality test and the hausman test were used.

3.1 Research hypotheses
Following the foot prints of previous researchers who conducted a research on similar topic of interest like Abdelrahim (2013) and Fredrick (2012), the following hypotheses and regression equations have been adapted.
H01: There is no statistically significant relationship between capital adequacy and credit risk management of commercial banks in Ethiopia.
H02: There is no statistically significant relationship between asset quality and the credit risk management of commercial banks in Ethiopia.
H03: There is no statistically significant relationship between management soundness and credit risk management of commercial banks in Ethiopia.
H04: There is no statistically significant relationship between bank's earning and credit risk management of commercial banks in Ethiopia.
H05: There is no statistically significant relationship between liquidity and credit risk management of commercial banks in Ethiopia.
3.2 Specifications of regression equations and empirical definition of the variables
In order to test the aforementioned hypotheses, the following regression equations adapted. The equations are presented as below:

$$\text{Equation one: } Y_{it} = \square_0 + \square X_{it} + \square_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (1)}$$
$$\text{Equation two: } Z_{it} = \square_0 + \square X_{it} + \square_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{ (2)}$$

Where:

Y_{it} and Z_{it} are the dependent variables natural logarithm of return on asset of the ith bank in year t and natural logarithm of the return on equity of the ith bank in year t, α_0 is the intercept (constant), β the coefficient of independent variables; x_{it} are the independent variables such as capital adequacy ratio of the ith bank in year t, asset quality of the ith bank in year t, management soundness of the ith bank in year t, earnings of the ith bank in year t and liquidity ratio of the ith bank in year t and ε_{it} is the error term.

The meanings of the variables in the regression equations have been explained as follows.
Return on asset: The return on assets (ROA) is a ratio that measures company earnings before interest & taxes (EBIT) against its total assets. The ratio is considered an indicator of how efficient a company is using its assets to generate before contractual obligation must be paid. It is calculated as: ROA= EBIT to total Assets.
Return on equity: Return on equity is especially useful in the valuation of banks, as traditional cash flow models can be very difficult to construct for financial companies, and return on equity models can offer similar information. It is measured by the ratio of EBIT to total equity fund.
Capital adequacy ratio: Capital adequacy ratio (CAR) is a specialized ratio used by banks to determine the adequacy of their capital keeping in view their risk exposures. It is measured by dividing capital to risk weighted assets.
Asset quality: Determines the robustness of the financial institution against loss of assets value as the deteriorating value of assets is the prime source of banking problems. It is measured by the ratio of nonperforming loan to total loans and advances.
Management quality: Management soundness is a qualitative variable that expresses the control of board of directors over the resources of the bank to protect shareholders interest. It is measured by assets turnover ratio and computed as the ratio of total operating income to total assets.

Earning: Earnings in terms of credit facilities can be measured by the ratio of net interest income to total operating income. Net interest income is good measure of banks earnings.

Liquidity: Liquidity refers to a situation where institutions can obtain sufficient funds, either by increasing liabilities or by converting its assets quickly to cash at a reasonable cost. It is computed by the ratio of credit facility to total deposit. The loans and advances to deposit ratio helps assess a bank's liquidity and by extension the aggressiveness of the bank's management.

IV. Analysis result and discussions

4.1 Correlation matrix

The table below presents the correlation among the variables used in the regression equations. A correlation measures the association between or among variables. A correlation coefficient of 1 indicates perfect positive correlation between the variables; a correlation coefficient of -1 indicates a perfect negative correlation between the variables and a correlation coefficient of 0 depicts no correlation between variables. One of the key assumptions needed to be true to run regression analysis is to make sure that the variables in use have correlation each other. Similarly, in this research, the general moment of person correlation was used to do the statistical analysis. The period of data used spans from 2010-2014. The analysis result is presented as in the table below:

Table 4.1 correlation matrix of the variables over the period of years 2010-2014

Covariance Analysis: Ordinary							
Date: 04/25/16 Time: 20:57							
Sample: 2010 2014							
Included observations: 55							
Correlation							
Probability	LOGROA	LOGROE	CAR	AQ	MS	E	L
LOGROA	1.000000						
LOGROE	0.186939	1.000000					
	0.1717						
CAR	0.129033	-0.497063	1.000000				
	0.3478	0.0001					
AQ	-0.110387	-0.025418	-0.175136	1.000000			
	0.4224	0.8539	0.2009				
MS	0.169367	0.521527	0.092766	-0.054159	1.000000		
	0.2164	0.0000	0.5006	0.6945			
E	-0.201882	0.176908	-0.107266	-0.249876	0.090257	1.000000	
	0.1394	0.1963	0.4357	0.0658	0.5123		
L	0.166268	-0.046428	0.142736	0.476098	0.075964	-0.270982	1.000000
	0.2250	0.7364	0.2985	0.0002	0.5815	0.0454	

Correlation is significant at 0.05 levels (2-tailed)
Source researcher's own computation using eviews software

Thus, it is clear from the analysis that regardless of the strength of the relationship between the variables; it is shown that the variables have some degree of association and regression analysis can be used.

4.2 Result of regression equation one

As described above under the heading research methodology, the type of data used in this research is a panel data and this type of data involves two types of equations- fixed effect and random effect which whichever is suitable for analysis. As discussed above in the methodology section, the hausman test is used to choice between fixed effect regression analysis and random effect regression analysis and results have showed fixed effect regression analysis is the appropriate analysis method to be used. The analysis result of the first equation the impact capital adequacy ratio, asset quality, management soundness, earnings and liquidity ratio on the log of return on asset is demonstrated in the table below.

Table 4.2 the estimated regression result of equation one

Dependent Variable: LOGROA				
Method: Panel Least Squares				
Date: 04/25/16 Time: 10:24				
Sample: 2010 2014				
Periods included: 5				
Cross-sections included: 11				
Total panel (balanced) observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.313880	0.544700	-0.576244	0.5678
CAR	0.008630	0.005104	1.690799	0.0989

AQ	-3.790281	2.072953	1.828445	0.0751
MS	0.003874	0.001251	-3.096291	0.0036
E	2.735899	0.831068	3.292030	0.0021
L	-0.006521	0.002037	-3.200764	0.0027
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.715757	Mean dependent var		1.221676
Adjusted R-squared	0.606433	S.D. dependent var		0.296394
S.E. of regression	0.185943	Akaike info criterion		-0.288708
Sum squared resid	1.348416	Schwarz criterion		0.295244
Log likelihood	23.93946	Hannan-Quinn criter.		-0.062889
F-statistic	6.547097	Durbin-Watson stat		2.567925
Prob(F-statistic)	0.000001			

Source researcher's own computation using eviews software

4.3 Analysis of goodness of fit of the regression equation
In a regression analysis, the goodness of fit statistics usually called the R^2 evaluates the explanatory power of the independent variables captured in the regression equation. Hence, as displayed in the above table, the R^2 statistics of the analysis result has shown approximately 71.58% (percent). This indicates that the independent variables are able to explain the variance in the dependent variable-log of return on asset by 71.58%. Since the independent variables are able to explain more than half of the variance in the dependent variable, then it is statistically good. Further, the overall goodness of fit of the regression equation used is evaluated by the probability value of the F-statistics estimated. If the estimated probability value of the F-statistics comes out to be significant ($p<0.05$), then the equation is assumed to be a good regression equation otherwise not. As a result for the estimated probability value-prob(F-statistics) is highly significant ($0.000001<0.05$) then the regression equation is good fitted.

4.4 Hypotheses testing
The hypotheses are tested as follows:
H01. There is no statistically significant relationship between capital adequacy ratio and credit risk management by Ethiopian commercial banks
The analysis of the regression result has showed that there is positive but insignificant relationship between capital adequacy ratio and log of return on asset along with coefficient statistics and probability value of 0.008630 and 0.0989. Then the hypothesis is accepted as the estimated probability value exceeds the alpha value of 0.05($0.0989>0.05$). Identical studies conducted by Afriyie and Akotey (2013), Abiola and Olausi (2014), Kurawa and Garba (2014) and Fredrick (2012) have also found the same findings. A study by Charles and Kenneth (2014) has found positive and statistically significant relationship between capital adequacy ratio and return on asset (ROA). Conversely Poundel (2012) have found negative but statistically significant relationship between capital adequacy ratio and return on asset
H02: There is no statistically significant relation between asset quality and the credit risk management by Ethiopian commercial banks.
The analysis result has showed there is a negative and insignificant relationship between asset quality and log of return on asset with regression coefficient and probability value of -3.790281 and 0.0751. The hypotheses is accepted for the estimated p-value surpasses the alpha value of 0.05 ($0.0751>0.05$). Studies by Muritala and Taiwo (2013), Fredrick (2012); Kaaya and Pastory (2013) and Abiola and Olausi (2014) have also showed similar result. However; studies conducted by Li and Zou (2014) and Afriyie and Akotey (2013) have revealed negative but significant association between asset quality and return on asset.
H03: There is no statistically significant relation between management soundness and credit risk management by Ethiopian commercial banks
The analysis of the regression output revealed that there is positive and significant relationship between management soundness and log of return on asset having coefficient statistics and probability value of 0.003874 and 0.0036. As the estimated probability value is lesser to the alpha value of 0.05 then the hypothesis is failed to be accepted ($0.0036<0.05$). Similarly, a study by Fredrick (2012) revealed similar output.
H04: There is no statistically significant relationship between bank's earning and credit risk management by Ethiopian commercial banks.
The analysis result uncovered that there is a positive and significant relationship between earnings and log of return on asset at regression coefficient statistics and probability value of 2.735899 and 0.0021. The hypothesis is failed to be accepted since the estimated probability value is smaller than the alpha value of 0.05($0.0021<0.05$). A study by Fredrik (2012) revealed also revealed similar result.
H05: There is no statistically significant relation between liquidity and credit risk management by Ethiopian commercial banks

The analysis result has clarified that there exists negative and significant relationship between liquidity ratio and log of return on asset together regression coefficient statistics and probability value of -0.006521 and 0.0027. The hypothesis is failed to be accepted as the estimated probability value shortfalls alpha value of 0.05 (0.0027<0.05). A study by Charles and Kenneth (2013) has also revealed similar findings. However, a study by Fredrick (2012) and M.Ojo et al. (2012) has revealed positive and statistically significant relationship between liquidity and return on asset.

4.4 Result of regression equation two

An alternate regression equation employed in this research presents the impact of credit risk measures like capital adequacy ratio, asset quality, management soundness, earnings and liquidity ratio on log of return on equity. The hausman test is employed to opt for between fixed effect regression analysis and random effect regression analysis and the result exhibited that the fixed effect regression analysis the appropriate analysis method to be used. The analysis result of the regression output is presented in the table below.

Table 4.3 the estimated regression result of equation two

Dependent Variable: LOGROE				
Method: Panel Least Squares				
Date: 04/29/16 Time: 04:59				
Sample: 2010 2014				
Periods included: 5				
Cross-sections included: 11				
Total panel (balanced) observations: 55				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.198831	0.557656	5.736203	0.0000
CAR	-0.009443	0.005226	-1.807117	0.0785
AQ	-3.625591	2.122261	1.708363	0.0955
MS	0.009159	0.001281	7.149525	0.0000
E	0.872619	0.850835	1.025603	0.3114
L	-0.004541	0.002086	-2.177098	0.0356
	Effects Specification			
Cross-section fixed (dummy variables)				
R-squared	0.865941	Mean dependent var		3.342237
Adjusted R-squared	0.814380	S.D. dependent var		0.441851
S.E. of regression	0.190366	Akaike info criterion		-0.241693
Sum squared resid	1.413325	Schwarz criterion		0.342259
Log likelihood	22.64655	Hannan-Quinn criter.		-0.015874
F-statistic	16.79444	Durbin-Watson stat		2.121281
Prob(F-statistic)	0.000000			

Source researcher's own computation using eviews software

4.5 Analysis of goodness of fit of the regression equation

The analysis of goodness of fit statistics in a regression analysis is basically evaluated by the R^2 statistics. As the R^2 statistics is the sum of the square of all regression coefficients, the R^2 value ranges between 0 and 1. The more closely the R^2 statistics to 1, a good is the regression equation and the more closely the R^2 statistics to 0, the less likely for the regression equation to be used. In short, the statistics is the measure of the explanatory power of the model (how much variance in the dependent variable is being explained by the independent variables used). In this regression reading the R^2 statistics accounts for approximately 86.59 %(percent). Thus the regression equation is statistically fitted to be used.

Further, there is also a need to assess the overall goodness of fit of the regression equation. The overall goodness of fit of a regression equation is examined by the probability value of the F-statistics. If the probability value of the F-statistics is significant ($p<0.05$), then the regression equation is a good regression equation. Hence, in this regression analysis result, the Prob(F-statistics) is significant (0.000000<0.05). The equation is generally fitted to be used.

4.6 Hypotheses testing

The adapted hypotheses have been tested as under

H01. There is no statistically significant relationship between capital adequacy ratio and credit risk management by Ethiopian commercial banks

The analysis of the regression reading has uncovered that there is an inverse and statistically insignificant relationship between capital adequacy ratio and log of return on equity at regression coefficient and corresponding probability value of -0.009443 and 0.0785. The hypothesis is accepted for the estimated probability value of 0.0785 outdoes alpha value of 0.05. A study by Abdelrahim (2013) has also found similar

finding while a study by Mwangi (2012) revealed inverse but significant relationship between capital adequacy ratio and return on equity.

H02: There is no statistically significant relation between asset quality and credit risk management by Ethiopian commercial banks.

The analysis has showed that there exists an inverse and insignificant association between asset quality and log of return on equity along with regression coefficient and probability value of -3.625591 and 0.0955 respectively. The hypothesis is accepted as the estimated probability value come above the alpha value of 0.05 (0.0955>0.05). A study conducted by Aduda and Gitonga (2011) have found similar result. Whereas Boahene, Dasah and Agyei (2012), Afriyie and Akotey (2013) and Charles and Kenneth (2013) have revealed positive and statistically significant association between asset quality and return on equity.

H03: There is no statistically significant relation between management soundness and credit risk management by Ethiopian commercial banks

The analysis result has showed there is a positive and significant relationship between management soundness and log of return on equity with regression coefficient and probability value of 0.009159 and 0.00001. The hypothesis is rejected as the estimated probability value of 0.00001 is lesser to alpha value of 0.05. A study conducted by Abdelrahim (2013) has found similar result.

H04: There is no statistically significant relation between bank's earning and credit risk management by Ethiopian commercial banks

The regression analysis has proved that there is a positive but insignificant relationship between earnings and log of return on equity along with the regression coefficient and probability value of 0.872619 and 0.3114. The hypothesis is accepted since the probability value of 0.3114 exceeds the alpha value of 0.05. A study by Abdelrahim (2013) has also revealed same result.

H05: There is no statistically significant relation between liquidity and credit risk management by Ethiopian commercial banks

The analysis reading exhibited uncovered that there is a negative but significant relationship between liquidity ratio and log of return on equity at the regression coefficient and probability value of -0.004541 and 0.0356. The hypothesis is rejected as the probability value of 0.0356 lesser to the alpha value of 0.05.

V. Conclusions

Financial institutions especially commercial banks' are popularly known by accepting deposit and granting of loans to the different classes of customers. In this manner, their main role is to act as an intermediary between savers and borrowers. However; the acceptance deposit and the granting of loan is not without risk. Commercial banks are normally exposed to credit risk when a borrower or a group of borrowers default to pay its obligation as agreed. Thus, the good the credit risk management practices of a bank the better will be its survival and the flourishing of a particular country's economy as well.

There is no universally accepted yardstick among the academicians and practitioners to measure risk so that risk measurement is both a conceptual and practical challenge that everyone faces in its everyday activity. Therefore, there is a need to triangulate risk measurement and management from several dimensions in all activities all the time.

This research paper has attempted to highlight the possible impact of credit risk management on the financial performance of Ethiopian commercial banks using log of return on asset and log of return on equity as dependent variables and capital adequacy ratio, asset quality, management soundness, earnings and liquidity ratio as independent variables. The audited financial reports of the banks over the period of years 2010-2014 have been used to account for these accounting ratios.

The major limitation of this research is that only the audited financial reports of the banks have been used in order to address about the subject under investigation even though commercial banks disclose minimal details about their risk management practices and strategies in their annual. The findings of the research is valuable for bank managers, board of directors and the regulator in assessing the strengths and weakness of the banks in the management of credit risk, its likely impact on performance and where the banks are heading about in the future.

References

[1]. Tony Van Gestel and Bart Baesens (2009) *credit risk management*; *basic concepts: financial risk components, rating analysis, models, economic and regulatory capital*, Oxford, United states: Oxford University Press Inc. New York.
[2]. Shelage Haffernan (2005) *modern banking*, John Wiley and Sons Ltd, the atrium, Southern gate, chichister,England.
[3]. Joes Bessis (2002) *risk management in banking*, 2nd edition, John Wiley & Sons Ltd, Baffins Lane, Chichester, West Sussex, PO19 1UD, England.
[4]. National Bank of Ethiopia (2009) banking industry risk management survey report, retrievedfromhttp://www.nbebank.com /pdf/bankrisk/SurveyReportrevised.pdf

[5]. Girma Mekasha (2011) *credit risk management and its impact on performance of Ethiopian commercial banks,* MSC thesis, Addis Ababa University, Addis Ababa, Ethiopia, retrieved from http://etd.aau.edu.et.
[6]. Engdawork Tadesse Awoke (2014*), impact of credit risk on the performance commercial banks in Ethiopia*, MSC thesis, Addis Ababa University, Addis Ababa-Ethiopia, retrieved from https://opendocs.ids.ac.uk.
[7]. Misker Bizuayehu (2015), *the impact of credit risk on financial performance of banks in Ethiopia,* MSC thesis, Addis Ababa University, Addis Ababa-Ethiopia, retrieved from http://etd.aau.edu.et.
[8]. Milion Gizawu, Matewos Kebede and Sujata Selvaraj (2015), the impact of credit risk management on the profitability performance of commercial banks in Ethiopia, *African journal of business management*, issn *1993-8233*, vol*9(2)*,pp 59-66, retrieved from http://www.academicjournals.org.
[9]. Ara Hosna, Bakaeva Manzura and San Juanjuan (2009), *credit risk management and profitability in commercial banks in Sweden*, master's thesis, University of Gothenburg, retrieved from https://gupea.ub.gu.se.
[10]. Josiah Aduda & James Gitonga (2011), the relationship between credit risk management and profitability among commercial banks in Kenya, *Journal of modern accounting and auditing.* ISSN *1548-6583*, Vol.*7,* No.9, 934-946, retrieved from http://www.davidpublishing.com/.
[11]. Samuel Hymore Boahene, Julius Dasah, and Samuel Kwaku Agye (2012), credit risk and profitability of selected banks in Ghana, *Research journal of finance and accounting*. ISSN *2222-2847* Vol *3*, No 7, retrieved from http://www.iiste.org/Journals/index.php.
[12]. Ravi Prakash Sharma Poudel(2012), the impact of credit risk management on financial performance of commercial banks in Nepal, *International Journal of Arts and Commerce.V.1* No.*5* retrieved from http://ijac.org.uk.
[13]. Grace N. Mwangi (2012), *the effect of credit risk management on the financial performance of commercial banks in Kenya*, master's thesis, University of Nairobi, retrieved from http://erepository.uonbi.ac.ke.
[14]. Junaidu Muhammad Kurawa and Sunusi Garba (2014), an evaluation of the effect of credit risk management on the profitability of Nigerian banks, *Journal of Modern Accounting and Auditing, ISSN 1548-6583,* Vol. *10,* No. 1, 104-115, retrieved from http://www.davidpublishing.com.
[15]. Kolapo, T. Funso, Ayeni, R. Kolade and Oke, M. Ojo (2012), credit risk and commercial banks' performance in Nigeria, *Australian Journal of Business and Management Research,*Vol.*2* No.*02*, retrieved from http://ajbmr.com/articlepdf.
[16]. Ogilo Fredrick (2012), the impact of credit risk management on financial performance of commercial Banks in Kenya, *DBA Africa Management Review,* V.*3* No.*1*, retrieved from http://journals.uonbi.ac.ke.
[17]. Taiwo Adewale Muritala and Abayomi Samuel Taiwo (2013), credit management spurs higher profitability, evidence from Nigerian banking sector, *Journal of applied economics and Business,*V.*1* issue*2*, retrieved from http://www.aebjournal.org.pdf.
[18]. Harrison Owusu Afriyie, Joseph Oscar AKOTEY (2013), credit risk management and profitability of rural banks in the Brong Ahafo region of Ghana, *European journal of business and management,* V.*5* no.*24*, retrieved from http://www.iiste.org/Journals/index.php.
[19]. Indiael Kaaya and Dickson Pastory (2013), credit risk and commercial banks performance in Tanzania, *Research Journal of Finance and Accounting,*Vol.*4*, No.*16*, retrieved from http://www.iiste.org/Journals/index.
[20]. Ogboi Charles and Unuafe, Okaro Kenneth (2013), impact of credit risk management and capital adequacy on the financial performance of Commercial Banks in Nigeria, *Journal of Emerging Issues in Economics, Finance and Banking* Volume *2* No.*3*, retrieved from http://globalbizresearch.org/economics/images/files.
[21]. Adeusi, Stephen Oluwafemi,Akeke, Niyi Israel, Adebisi,Obawale Simeon, Oladunjoye, Olawale (2013), risk management and financial performance of banks in Nigeria, *Journal of Business and Management,* Volume *14*, Issue *6.*
[22]. Khalil Elian Abdelrahim (2013), effectiveness of credit risk management of Saudi banks in the light of global financial crisis, *Journal of Asian Transactions on basic and applied Sciences*, Volume *03* Issue *02*, retrieved from http://asian-transactions.org.